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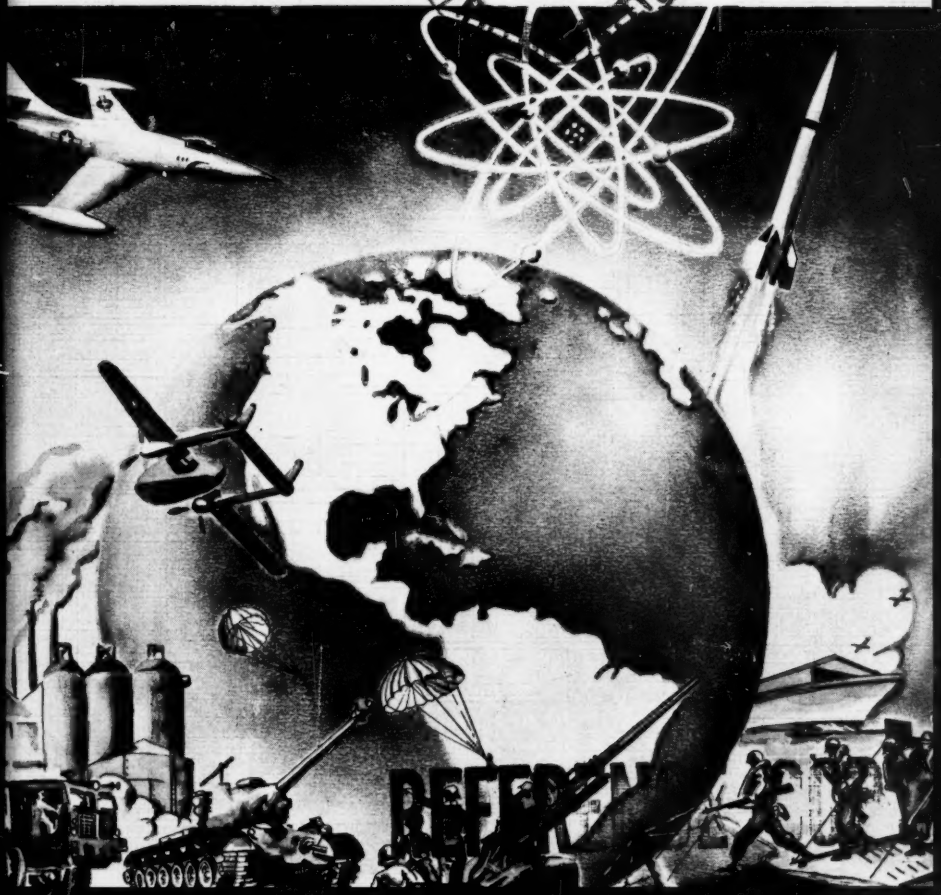
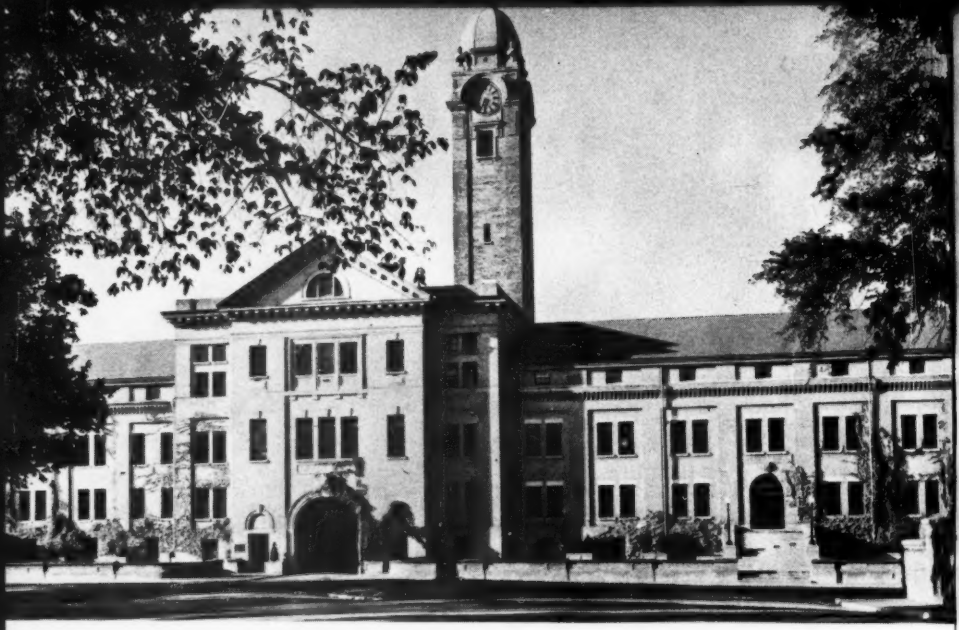


COMMAND AND GENERAL STAFF COLLEGE
FORT LEAVENWORTH, KANSAS

APRIL 1951—VOLUME XXXI NUMBER 1



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Thoughts on the American Airborne Effort in World War II

Dr. James A. Huston
Assistant Professor of History, Purdue University

The views expressed in this article are the author's and not necessarily those of the Department of the Army, the Army War College, or the Command and General Staff College.

This is the first of a series of two articles on this subject. The second article in this series will appear in the May issue.—The Editor.

FROM small beginnings, the American airborne program grew into a major enterprise. It was a long way from a test platoon at Fort Benning, in 1940, to the Airborne Command at Camp Mackall, in 1943. It was a remarkable advance from the scattered drops of a parachute battalion in North Africa, in 1942, to the massive airborne invasions of Holland, in 1944, and across the Rhine, in 1945. It has been a long, arduous course beset with the difficulties of selling new ways of warfare and of competing for men and equipment against more firmly ensconced programs. Not the least remarkable achievement of the airborne effort was the extent to which the handicaps to training were overcome in building combat units which were uniformly successful, and whose troops won universal respect as effective fighters. They were able to achieve an *esprit de corps* which was the envy of other units, and their reputation for individual and small-unit fierceness in combat won the admiration of their comrades and the fear of their enemies.

The airborne effort played a significant part in operations impressive in size and number, and often added effective strength to ground combat. It would be difficult, however, to describe the use of airborne troops, as such, in any operation as unquestionably decisive. The first parachute drops in North Africa had little to contribute but experience for future plans and training. Perhaps the airborne operation in Sicily, in spite of the misfortunes which accompanied it, was decisive for the holding of a particular segment of the beach at a particular time; but even if that were so, it would be difficult to conclude that the whole amphibious assault would have been a failure had no airborne operation supported it. On the contrary, the results might have been more impressive if all the resources committed to the airborne attack had been diverted to building up the amphibious force.

Possibly the reinforcement of the Salerno beachhead by airborne troops was decisive in saving that situation. There,

From small beginnings, the American airborne program grew into a major enterprise. It played a significant part in operations impressive in size and number, often adding effective strength to ground combat

the speed with which parachute troops could be committed was important in a crisis where forces needed immediate strengthening. The parachute drop near Nadzab, New Guinea, was an outstanding success, but again it cannot be concluded with finality that those troops would not have been just as effective had they marched in overland as did the engineers who joined them shortly after the drop. It probably was a useful thing to have airborne troops drop behind the defenses of Utah Beach in Normandy, but it would be farfetched to assume that the amphibious assault against that beach would have failed without airborne troops when it succeeded against the more formidable defenses of Omaha Beach without them. Neither is it likely that the invasion of Southern France would have failed without the airborne phase of that operation any more than did the scores of American amphibious assaults which invariably succeeded elsewhere without the use of airborne troops. On the other hand, some of those amphibious operations might have been less costly if airborne troops had been used in conjunction with them.

Burma presented a somewhat different situation. The use of gliders to carry British and Indian troops deep behind Japanese positions was disappointing, but the use of airplanes to fly in reinforcements, as at Myitkyina, and to drop or land supplies, may well have been a decisive factor in the reconquest of Burma. The air invasion of Holland came very close to winning a decisive crossing of the Lower Rhine, but it did not. Undoubtedly, it made a valuable contribution in securing a corridor deep into Holland, and in securing bridges intact over the Maas and Waal. But again, it is questionable whether the results justfied the cost in men, resources, and time expended.

The use of paratroops on Noemfor Island hardly was necessary for they landed on engineer equipment already brought in by sea. Neither can it be said, conclusively, that the spectacular airborne assault across the Rhine added materially to the speed or effectiveness of the ground advance north of the Ruhr. The advances south of the Ruhr, without airborne support, were as rapid and less costly in resources.

It may be that the parachute drop on Corregidor was the factor contributing most to the relatively low ratio of American to Japanese casualties in the retaking of "The Rock." But the airborne training and equipment of the 11th Airborne Division appears to have been mostly wasted, for airborne operations contributed little to the reconquest of the Philippines, and that division generally was committed to combat as an ordinary infantry division. This was a costly practice, for specially trained parachutists had to replace those of the parachute units who became casualties in such actions.

Airborne operations seemed, too frequently, to bear the appearance of an expensive luxury—of something which created an impressive display, but which really was not essential to the task at hand. But if that was so, perhaps it was because higher commanders failed to approach the use of airborne troops in any other manner. When a commander would agree to airborne operations only after it had been made clear that they would not create demands for resources to be taken from other ground or air actions, and as long as a commander expressed a desire to launch a major strategic airborne operation, but never could spare the divisions, the airborne effort hardly could escape the appearance of a military luxury. A difference in emphasis which, on the other hand, would have regarded the use of airborne troops as essential might have made it so. An approach which would have insisted upon the resources

necessary for strategic airborne operations, even at the expense of supply by air for ground troops and for strategic air forces, might have seized upon an instrument which would have been far more effective in achieving ultimate military victory.

Airborne experiences, in World War II, in reality, were not broad enough to furnish the final answers as to how important a role parachute and glider troops might play. While the decisive influence of airborne troops in any major operation may be seriously questioned, the distinct possibility remains that, used with more imagination, more boldness, and greater skill, airborne troops might have been completely decisive in bringing military victory sooner, at less cost in manpower, time, resources, and casualties.

Airborne Doctrines

When the introduction of parachute troops into the United States Army first was being discussed seriously, a general supposition seemed to exist that such troops would be used principally, in small detachments, for demolition work in enemy rear areas. That notion soon gave way to the concept that parachute troops should be used as a spearhead to seize airfields for air-landed troops. Neither assumption ever became the basis for actual major operations in World War II.

Actual operations did follow rather closely, however, the statements of doctrine published in War Department Training Circular Number 113, dated 9 October 1943. At that time, only the experiences of airborne landings in North Africa, Sicily, Italy, and New Guinea, together with the examples of German operations, were at hand to form the basis for those generalizations. Yet airborne commanders generally considered the principles, then stated, as basically sound throughout the War. But practice, frequently, was at variance with stated doctrine, and experience suggested certain modifications and extensions.

American airborne operations in World War II provided examples for over half of the suggested missions outlined in War Department Training Circular Number 113. In addition, the missions of some of the operations might be interpreted as covering several of those suggested. The air invasion of Holland put into practice, on a large scale, the first suggested mission—"To seize, hold, or otherwise exploit important tactical localities in conjunction with or pending the arrival of other naval or military forces"—when airborne troops seized vital bridges pending the arrival of the Guards Armored Division.

The second stated mission was, "To attack the enemy rear and assist the break-through or landing by the main force." The airborne landings in Normandy and east of the Rhine applied to that statement. A third mission stated for airborne troops was, "To block or delay enemy reserves by capturing and holding critical terrain features, thereby isolating the immediate battlefield." This was done, partially, in the Normandy operation, but the Sicilian and Southern France operations probably are the best examples.

At Salerno, paratroops fulfilled the suggested mission, "To reinforce threatened or surrounded units." For the mission, "To seize islands or areas which are not strongly held and which the enemy cannot easily reinforce," Corregidor provides the best American example, though that operation was co-ordinated closely with a sea-landed force (the German invasion of Crete remains the classic example). Finally, airborne troops, doubless, were useful, "As a constant threat by their mere presence in the theater of operations, thereby causing the enemy to disperse his forces over a wide area in order to protect his vital installation."

To suggest that airborne operations,

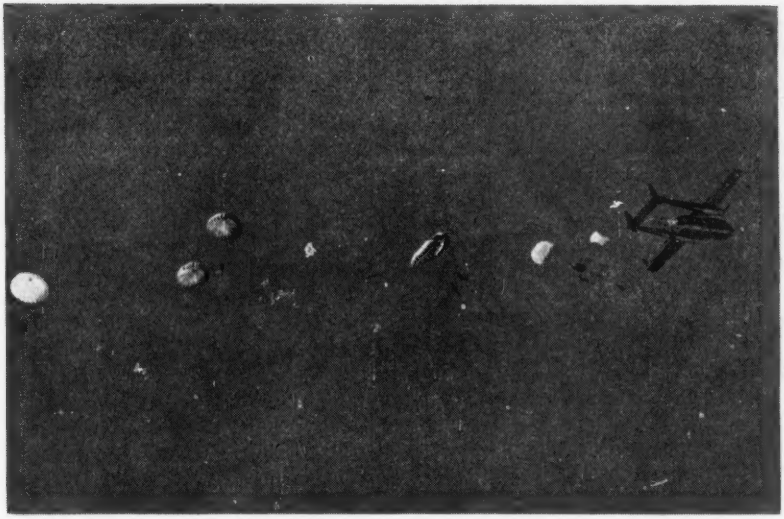
generally, had missions following accepted statements of doctrine does not, of course, mean that those missions were, necessarily, the best use for airborne troops. Other missions stated in the same circular, but neglected in combat, might have been far more effective, and others not mentioned in the circular might have been equally useful. Missions stated for airborne troops in the training circular included five others:

1. To capture enemy airfields.
2. To capture or destroy vital enemy installations and thus paralyze the enemy's system of command, communications, and supply.
3. To create diversions.
4. To assist the tactical air forces in delaying retreating enemy forces until the main ground forces could destroy them.
5. To create confusion and disorder among hostile military and civil personnel.

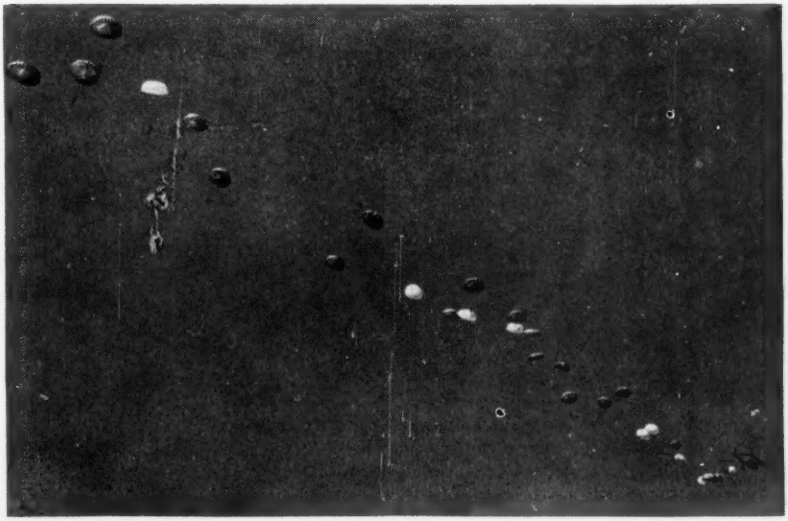
In spite of repeated statements and the almost invariable assumption in maneuvers that enemy airfields should be major objectives for airborne attack, it almost never was so in actual operations. After the Holland operation, an aviation engineer officer wrote that an airfield should be among the primary objectives in any airborne operation. He said, "They should not be relegated to secondary priority behind bridges, cities, or any other priorities, because without an airfield it may not be possible to hold primary ground objectives until the link up with ground troops." Why others did not accept that view is not clear. Perhaps it was because airborne troops, in Europe, always were used in conjunction with a ground attack planned for an early link up, as well as the likelihood of strong antiaircraft defenses around an airfield. However that may be, Myitkyina airfield in Burma, while not captured by air assault, proved its critical value in permitting the reinforcement and resupply of ground troops by air-landing operations. The use of airborne troops to seize airfields ahead of the racing ground armies, in Western Europe, might have made possible a much greater use of supply by air to keep those armies going. Paratroops did seize an airfield at Nadzab, New Guinea.

About the only example, in World War II, where airborne troops were used to paralyze the enemy's system of command, communications, and supply; to create diversions; and to create confusion and disorder, deep in enemy rear areas, was the glider landing of General Wingate's long-range penetration columns in Burma. In this case, the troop carrier aircraft were mostly American, but the troops were British and Indian. Similar objectives might have been appropriate to Europe and North Africa, but there was an important difference. Because of the jungle in Burma, it was difficult for the enemy to move reinforcements into the area where troops were landed, and the threat of armored counterattack was not great. Quite the contrary was true, of course, in Europe, but that disadvantage might have been overcome through the skillful use of tactical aviation to isolate the battlefield and to provide close ground support.

Though the opportunity certainly presented itself several times in Europe, airborne troops never were used to block retreating enemy forces until the main ground forces could destroy them. It is possible that the drop of two or three airborne divisions between Falaise and Argentan, about 12 August 1944, could have closed the escape route of the Germans in the pocket there and so brought about their annihilation. The First Allied Airborne Army was, in fact, at that time planning operations with similar objectives in view. On 13 August, airborne units moved to departure fields for Operation *Transfigure* whose objective was to block the German retreat through the Paris—Orleans gap. Apparently General



Above, paratroopers jumping in a "double stick" of two men each. Below, the same group 1 minute after leaving the plane. The colored parachutes make it easier for the paratroopers to regroup and reorganize once they have hit the ground, as well as offer camouflage protection.—Department of Defense photos.



Eisenhower was reluctant to launch the airborne attack because of the heavy demands for ground transport which he feared would be increased thereby. Then [the Supreme Commander reported], ". . . the capture of Dreux rendered the projected airborne operation in the Paris—Orleans gap unnecessary." If the seizure of a particular piece of ground were the primary objective of that offensive then, of course, the airborne attack was not necessary. But if a battle of annihilation were being sought, then an airborne operation might have been the very instrument to bring it about.

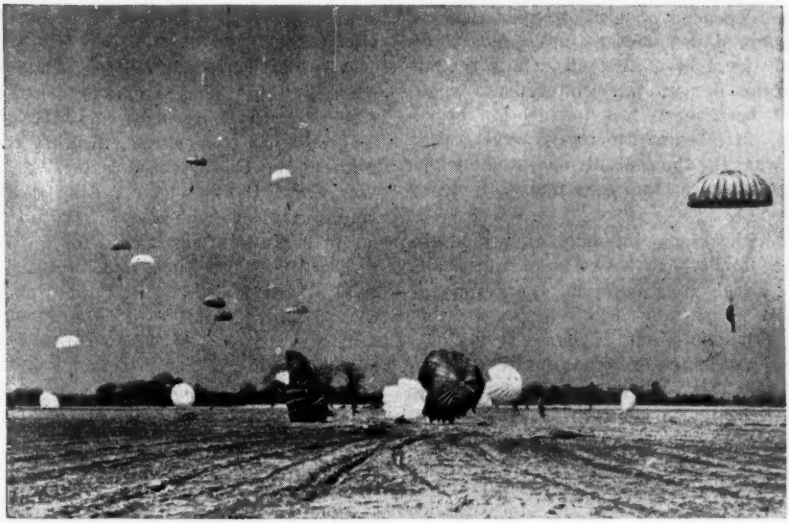
Successive airborne operations were planned and mounted almost to the point of take off, and then cancelled because the ground troops had overrun the proposed objective. That only could have meant that objectives were not being selected deep enough in enemy-held territory, or that airborne operations were not being mounted swiftly enough. True enough, ground forces were overrunning proposed airborne objectives, but they were only extending their lines of communication. They were not destroying completely the enemy's forces, and enemy troops were escaping eastward where, one day, they would turn and fight bitterly along the Moselle River and in the Siegfried Line. In those circumstances, airborne troops, held out as a "strategic threat," could have little real effect.

Though not included in Training Circular Number 113, but always in the background of airborne thinking, was the possible use of airborne forces to win strategic objectives—to seize and maintain an airhead from which an offensive could be launched without immediate ground support. Something of that concept entered into most of the airborne maneuver problems—the seizure of an airfield by paratroops, the build-up by glider and airlandings, and the launching of a ground attack—though, there, it generally had been presumed that a link up with ground troops should not be delayed longer than 3 days. The nearest that any operation ever came to that conception took place in the Nadzab-Markham Valley, in New Guinea. There, however, reinforcements and heavy equipment could move in overland, and the operation was not on the scale which some officers visualized for Europe. The Burma operations implied something of this concept on a small scale. Leaders, thinking in larger terms, however, always were disappointed. General Arnold and General Marshall both were anxious to try uch an operation at the time of the in· asion of Normandy. General Arnold wrot·

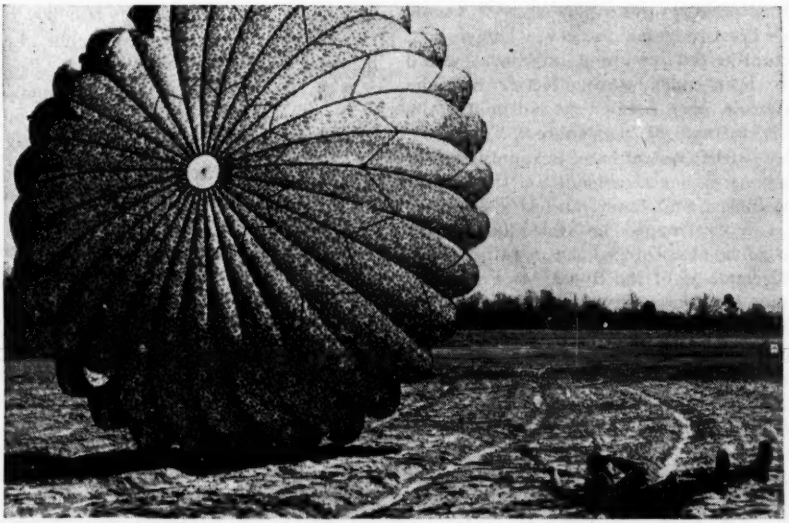
It was obvious that General Eisenhower's staff had no intention of using airborne troops except for tactical missions directly in rear of enemy lines. The Air Force wanted to use these troops strategically, i.e., take a mass—four or five divisions—drop them down in a specially selected transportation center, for example—an area where there were several aviation fields, a locality that would be astride the German lines of communication, a position, the holding of which would make it impossible for the German troops to advance reinforcements and supplies, but definitely an area some distance behind the actual battlefield and beyond the area in which reserves were normally located.

General Marshall stated in his letter of 10 February 1944 to General Eisenhower that if he [Marshall] were in command of Operation *Overlord*, this is exactly the sort of thing he would do. The eyes of General Eisenhower and his staff, however, were fixed on obtaining the port of Cherbourg as quickly as possible. Moreover, airborne commanders were apprehensive about an armored counterattack against an airhead.

To the first objection, it could be replied that a port would have been less necessary if supplies were going in by air. (As it actually turned out Cherbourg did not fall until 27 June 1944, 2 weeks behind schedule, and then it was so thoroughly wrecked that it took another 3 weeks to get it into operation.) The threat of armored counterattack was a serious one. An antitank defense would



Above, paratroopers on or near the ground, getting ready for action. Below, a paratrooper hitting the ground according to approved technique. Paratroopers are generally jumped from an altitude of 500 feet from planes traveling at an air speed of approximately 100 miles an hour.—Department of Defense photos.



have depended upon effective tactical air support and upon antitank guns which could have been air-landed. But the immediate danger of counterattack might have been much less in such an operation, far behind enemy reserves, than it was in the actual operation which came down in the very midst of enemy reserves.

Whether the maintenance of such an airhead would have been sound logistically is another moot question. On a tonnage basis, it probably could be shown that it was possible; but, of course, transportation by air is not simply a matter of total tonnage. The difficulty of moving heavy, bulky equipment must be taken into account. Solutions to some of those problems had been demonstrated, in New Guinea, where transport planes and heavy bombers had carried 2½-ton trucks, 105-mm howitzers, and tractors. In the actual airborne operation in Normandy, 17,400 troops landed. On D plus 1, about 250 tons of supplies were dropped to the 82d Airborne Division.

Presumably this performance could have been repeated for several days, and certainly the resupply missions would have been much more effective had the materials been landed at adequate airfields instead of parachuted. That sufficient airlift was at hand to supply several divisions becomes evident in the report that British and American heavy bombers, on D-day, dropped no less than 10,395 tons of bombs. During the month of May 1944, bombers of the Royal Air Force and Army Air Force dropped approximately 190,000 tons of bombs.

During late August, September, and October 1944, the United States First and Third Armies were dependent almost entirely on supplies delivered by trucks of the Red Ball Express. On its peak day, this truck service carried 12,000 tons. It averaged less than 6,000 tons a day during September and October when it was the principal means of delivering supplies.

When the "blockade" of Berlin was imposed in the summer of 1948, American forces in Germany had only 100 *C-47* transport and troop carrier aircraft. Some four-engine *C-54s* (used extensively in World War II by the Air Transport Command) replaced the *C-47s*; 160 of the larger craft were earmarked for the Berlin Airlift by late 1948, and, in 1949, the total allocated was 224. But these planes, with British support, were able to carry a daily average of 5,500 tons during the winter weather of January and February and, in the spring, they reached an average of 8,000 tons a day. Their record day's haul was 13,000 tons.

But in his reply to General Marshall, on 19 February 1944, General Eisenhower noted that a greatly increased force to support and maintain airborne operations would have been available if all-out strategic and tactical bombing were not being planned. It seems, then, that the establishment of an independent airhead in France might have been feasible logistically by diverting available heavy bombers to its support.

Had such an operation been assumed in the early planning for *Overlord*, it might have had further assurance of success if:

1. The *C-97* (*Stratocruiser*) had been assigned as high a priority in production as its bomber equivalent, the *B-29*.

2. Four-engine *C-54s* had been made available to the Troop Carrier Commands as well as to the Air Transport Command (in numbers equal to those, say, of the postwar Berlin Airlift).

3. Some of the materials and labor which went into the construction of the more than 5,000 ships plus 4,000 additional ship-to-shore craft used for the amphibious assault had gone into the production of more transport aircraft.

4. The heavy bombers had carried cargo

tonnage equal to a large percentage of the bomb tonnage which they carried.

5. Tactical air support had been perfected to the point where it could protect the airhead against counterattack and replace heavy artillery for the ground offensives.

The *Market* operation in Holland suggested some of the possibilities, and the plans for Operation *Arena*—the operation which would have established an independent airhead east of the Ruhr—were based largely on that experience. (Operation *Arena* assumed a daily requirement of 300 tons for each division.) In Operation *Varsity*, across the Rhine, airplanes and gliders in 1 day dropped 22,341 troops, 2,390 tons of supplies, 1,096 vehicles, 454 artillery weapons, and 390 gallons of gasoline.

A board of officers convened by Army Ground Forces, in 1945, to study the equipment of the postwar Army made its recommendations for airborne and troop carrier equipment on the premise that operations from an airhead, as planned for Operation *Arena*, would be normal procedure in the future. The board agreed that airborne operations of the future, when executed on a major scale, should consist of four phases as follows:

> Phase I.—In this phase, airborne troops should be utilized to seize and secure an airhead, and prepare it for Phase II of the operation. . . .
>
> Phase II.—In this phase, the transporting of any divisions started in Phase I should be completed and, in addition, standard ground divisions should be landed by cargo plane and glider for the purpose of expanding and further developing the airhead and objectives secured in Phase I. . . .
>
> Phase III.—In the final operational phase, corps and army units should be landed for the completion of the combat mission, final objectives secured, and the airborne phase of the operation closed out. . . .
>
> Phase IV.—This is the supply phase of the operation and is continuous throughout the mission or until such time as adequate supply through more economical channels can be established and maintained.

Airborne officers foresaw the development of aircraft which, together with the development of devastating explosives, would make possible the movement of airborne and air-transported troops to points far within enemy territory, behind his reserves, and within his industrial districts.

The Army Ground Forces further indicated that:

> This will place airborne and air-transported operations on a par with the amphibious operations of the present. Air-transported troops will be moved from one protected "Air Harbor" to the equivalent of a beachhead within enemy territory—not in front of the enemy lines, but well behind them. In operations of this sort the strictly airborne troops will enter the landing area by parachute and glider as a spearhead to prepare the way and secure the landing area for regular infantry divisions being transported to fields within the area by plane. As the Air Force is now working on the development of planes capable of transporting tanks, the possibility of such operations is not far in the future.

Whether those new transport planes would enjoy any higher production priority, in competition with long-range bombers, than had the *C-82* or the *C-45* in World War II was, of course, another question.

Another possible tactical use of airborne troops which later won official recognition, though it never had been attempted in combat, was to counter enemy airborne attacks by landing on top of the enemy airborne forces. British paratroops had landed on German parachute reinforcements which had just arrived in Sicily, but the results are obscure. Surely that kind of an operation on a large scale would lead to a wild melee, but perhaps it could disrupt an enemy airborne attack. German specialists in airborne tactics adhered to the theory, again without practical experience, that the best defense against an air-landing was a counter-landing into the enemy airhead. It may be that just as it developed that planes are the best defense against other aircraft or, more slowly, the recognition that tanks are the best defense against other tanks, so it will be found that counterairborne operations are the best defense against airborne operations.

However, serious objections to this concept must be noted. Ordinarily, an airborne attack is not launched without almost complete air superiority, and it would be very difficult to launch a counterlanding against an enemy who retained mastery of the air. Another difficulty would be the time necessary to plan, co-ordinate, and mount an airborne counterattack when, to be most effective, it should come immediately after enemy troops have landed.

This does, however, suggest another possible use of airborne troops: that is, to counterattack against an enemy ground offensive. An airborne drop astride the enemy's communications, when he is disposed to attack, might foil his operation and turn the tide of battle. The action of the 101st Airborne Division at Bastogne, though the division had moved in overland, was similar to what it might have been had the division landed there by parachute and glider after the German offensive had passed well beyond Bastogne. That is, it was similar with this important difference: the tanks which supported the Bastogne garrison could not have gone in by air. Airborne commanders felt that the troops of the 82d Airborne Division, who dropped to reinforce the Salerno beachhead, would have been much more effective had they been dropped behind the enemy lines instead of within the friendly positions.

Experience brought a great many changes in the techniques of employing airborne troops. Early in the War, in North Africa and Europe, daylight operations were avoided. The presumption was that disastrous losses from antiaircraft fire could be escaped only at night. The unfortunate episode of Sicily demonstrated that sometimes friendly antiaircraft fire could not be avoided even then. The price paid for caution was widely scattered drops in North Africa, in Italy (Avallino), and in Normandy. Ironically, the disappointing Sicilian operation led to new emphasis on night operations in all the joint maneuvers which followed it for the 11th, the 13th, and the 17th Airborne Divisions—and then not one of those units ever participated in a night combat jump.

By the time of the air invasion of Holland, airborne officers had become persuaded that the advantages of daylight operations, at least in the situation then obtaining, would outweigh its disadvantages. If antiaircraft batteries were controlled by radar, darkness would offer little protection against them. On the other hand, flights of friendly fighters and dive bombers probably would be more effective in beating down flak in daylight. At the same time, the German night-fighter force in northwest Europe, in September 1944, posed more of a threat than did its daylight interceptors. Again, escorting fighters could be more effective in daylight. Above all, the problems of navigation, of keeping troop carriers in formation, and of the troops' assembling on the ground were far simpler in daylight than in darkness. The success of the landings in Holland, in sharp contrast to the scattering of earlier operations, was such a convincing demonstration that no further night operations were attempted. The *Varsity* operation, east of the Rhine, was another notable success in daylight.

American experience with glider troops was so disappointing that Army Ground Forces, in its study of airborne forces for the postwar military establishment, prepared after consultation with airborne officers in all theaters, concluded that gliders should be used only for the transportation of cargo. This was a decided change from the earlier concept that the greater portion of an airborne division should be gliderborne. The change was based upon several factors: the vulnerability of gliders, to antiaircraft and ground fire, resulting in a higher per-

centage of casualties to glider troops than to parachute troops before and immediately after landing; the need for open fields for glider landings; the great amount of air space taken up by glider formations; and the expense of using gliders which could be used only once in most operations for they were not often recovered intact.

One reason why glider troops suffered heavier casualties than paratroops, in the cases where that was so, may be found in the fallacy of the American principle that paratroops should always precede glider troops by enough time to clear the landing zones for the gliders. Instead of preparing the way for easier glider landings, such parachute drops were likely to alert the enemy defenses in time to become effective against the gliders. In a successful airborne operation, the safest place in the column generally was near the head, where the first elements could jump with the benefit of surprise. Doubtlessly, impressed by the German glider assaults at Fort Eben Emael, in Belgium; at Corinth (Greece); and particularly on Crete, the British liked to send glider serials in ahead of, or at the same time as, the parachute serials. But the British glider assault on Sicily fared no better than the American parachute drop, although it might have if airplane and glider pilots had been better trained.

The advantage of using gliders (aside from their use to deliver heavy equipment) was that they landed whole units in one place where they could open fire in a matter of seconds. Skilled glider pilots could glide their craft to a pinpoint target with much greater precision than parachutists could influence their own descent. The advantage of using parachute troops was that a much greater number could be delivered in a much shorter time. This would suggest a flexible rule: that in some situations gliders should be preferred and, in others, parachute drops would be better.

The need for open fields for glider landing zones imposed another limitation on gliders. This difficulty had become evident in planning for the Normandy operation. The experiences of the 82d Airborne Division in Normandy when the Raff Force (a task force commanded by Colonel Edson D. Raff) was unable to clear the landing zone before the glider serials arrived on the evening of D-day and, in Holland, where gliders landed while German forces had the landing zone under fire might have indicated the desirability of selecting alternate landing zones in advance. War Department Training Circular Number 113 included this consideration, and its observance might have made those unfortunate experiences unnecessary.

The matter of timing and co-ordination was most important in airborne operations contemplating an early link up with a surface attack. In most operations of this kind, in World War II, the airborne attack preceded the amphibious landing or the ground attack by several hours. Presumably, this was to engage the enemy reserves and thus facilitate the surface operation. German appraisals after the Holland operation suggested, however, that that attempt might have been completely successful if the ground attack had been launched in advance to draw reserves from the critical areas which were the airborne objectives. General Miles Dempsey, commander of the Second Army (British), insisted upon this pattern for the crossing of the Rhine. There, the airborne assault came several hours after the river crossing. The results were completely successful, but the situation was such that any well-planned and well-executed airborne attack probably would have been successful, regardless of the time at which it was launched.

Pathfinders unquestionably proved their worth at Salerno, in Normandy, and in the daylight operations in Holland and across the Rhine as well. In the Corregidor operation, drop control was exercised from an airplane flying above the drop zone and the troop carrier formations. This procedure, however, did not prove to be as effective as the pathfinder technique and control from the ground.

The trends of modern war make it increasingly obvious that all three of our Armed Forces will have vital roles in a future war and that greater co-operation between the three services will become more and more essential.

Lieutenant General Matthew B. Ridgway

As the Army program to make its weapons and equipment air transportable and the Air Force program to increase the lift capacity of its aircraft progress, the airhead operation becomes a potent capability—a capability that a belligerent nation cannot take lightly.

Major General Otto P. Weyland

Deliberations on Armor

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The views expressed in this article are the author's and are not necessarily those of the Department of the Army, the Army War College, or the Command and General Staff College. —The Editor.

THE Korean campaign has, once again, focused the eyes of the military world on that enigma of the battlefield, the tank. The tank has been lifted from the mothballs, its plastic cocoon removed, and it is now being examined with a critical eye by both the layman and the professional. Fortunately, such scrutiny is not new in the life of this weapon and so it will, undoubtedly, survive without too much embarrassment.

The "Billy Mitchells" of the armored force are now trumpeting that the tank is the decisive ground weapon of the battlefield; that the tank dominates the battlefield; and that without it the infantry can neither advance nor defend itself against an enemy who possesses and uses this weapon. As an example, they point to Korea and say, "We were dominant on the sea; we had complete superiority in the air; terrain was favorable for defense and delay; but still the enemy advanced. Why? Because he possessed and made use of his tanks to such an extent that the hapless South Korean and United Nations' forces could not stand against him."

How much truth is there in these statements? What is the role of the tank in the ground force team?

With the tremendous increase in the number of tanks organic to the present infantry division as compared with the World War II division, and the corresponding increase in the number of tanks found in the type corps and field army, it is vital that commanders and staff officers have an understanding of the capabilities and limitations of this weapon and how it should be employed. How vulnerable is the tank to enemy gunfire? How mobile is the tank? Should it be employed in mass? Is the tank, as the early stages of the Korean campaign seemed to indicate, the decisive ground weapon of the battlefield? These and many other questions are being asked by officers, with and without armored experience, who sincerely wish to know what to expect from their tanks.

The purpose of this article, then, is to consider briefly those areas wherein the greatest amount of confusion seems to exist; to discuss a few of the capabilities and limitations of the tank; and

To achieve the maximum effectiveness from armor, commanders must understand its capabilities and limitations. Normally, its primary role is assault action; its secondary mission is support of the infantry

to examine some aspects of its employment in the infantry division.

In Korea, the tank, skillfully used by the North Koreans, did prove to be the decisive weapon on the battlefield for the greater part of the campaign. It was not until the United Nations' forces obtained tanks in comparable numbers that the lines began to stabilize. Thus, the obvious conclusion can be drawn that the tank proved to be decisive, in the early stages of the Korean battle, only because one side possessed a superiority of tanks while the other side had no effective means of countering this superiority. To follow this reasoning to its logical conclusion, then, would not the same have been true if the South Korean Army had had plenty of tanks but little or no infantry, or if they had had an abundance of infantry and tanks but little or no artillery? The answer should be obvious.

It is fundamental that the side which achieves a decisive superiority in infantry, artillery, or tanks, and employs them skillfully under conditions favorable for their use, has a better chance of defeating the enemy. That is what the North Koreans did. In addition, they also had made extensive plans and preparations for their campaign. They had the advantage of surprise when they launched it. They greatly outnumbered the forces opposing them for much of the campaign. And they massed their forces skillfully to achieve a break-through followed by a rapid exploitation before the South Korean Army could regroup. These factors in themselves, it might be noted, represent a majority of the essentials necessary for success in battle.

Tanks, infantry, and artillery, then, are all decisive on the battlefield and must work as a co-ordinated team to achieve victory. In any given engagement, however, usually there will exist certain specialized conditions which will permit or require the dominance of one of these arms over the others to ensure the defeat of the enemy. Thus, in the deserts of Africa or on the plains of North Germany the tank may predominate; while in the mountains of Italy, infantry and artillery will have the dominant role. But no matter what the conditions may be, or which plays the leading role, the other two have vitally important supporting roles which are necessary for the success of the campaign or battle.

Now that we have placed the tank in its proper perspective with relation to the other major elements of ground combat, it might be well to digress for a moment to consider briefly the future of the tank. There are many who consider that the latest developments in scientific research are sounding the death knell of the tank in much the same fashion as was done for the horse. To date, however, no such developments have been revealed. Pending their development, it is probably safe to assume that as long as there are requirements for mobility, maneuverability, and armored fire power on the battlefield, there will exist a requirement for tanks. And as long as the infantry exists, there will be requirements for such maneuverability, mobility, and fire power.

Weapons of the atomic age which may render infantry, artillery, as well as tanks obsolete conceivably may be developed in the future. Pending the arrival of such weapons, we can predict that there will be no material change in warfare as we now know it.

Now, with the immediate future of the tank temporarily secured, we can turn to a closer examination of the weapon itself.

Vulnerability

The use of the *M46*, the tank organic to the infantry division, like all tanks, is influenced by certain types of terrain which restrict or prohibit entirely armored operations. Likewise, its effectiveness is limited by certain types of enemy

defensive works such as antitank (AT) ditches, obstacles, and extensive mine fields. Like all other vehicles, its effectiveness may be impaired by improper maintenance, and by a lack of logistical support, particularly fuel to run it. Finally, it is vulnerable, in varying degrees, to enemy fire from both the air and ground. Our discussion will cover only this latter grouping—the vulnerability of the tank to enemy fire.

The *M46*, the tank organic to the infantry division. This versatile weapon is armed with a 90-mm gun, and is capable of speeds up to 30 mph.—Department of Defense photo.

How vulnerable is the present *M46* tank to enemy fire? In general, it can be said that the only way to stop effectively large numbers of tanks is by means of other tanks, thus giving rise to the saying that, on the battlefield, "armor attracts armor." If that is true, then what about artillery, aircraft, the AT gun, and the rocket launcher (bazooka)? The answer is that, although these weapons possess the capability of stopping tanks, they all require certain specialized conditions which are favorable for their effective use. This is not true of other tanks. Where our tanks can go, so can the tanks of the enemy.

Artillery.—What are the limitations of artillery when employed against tanks? Light artillery (105-mm), employing indirect fire techniques, generally is ineffective against even the World War II *Sherman* tank. This is true because of the difficulties of obtaining a direct hit against a moving target, and because of the low explosive power of the weapon's projectile which is not great enough to injure the crew or seriously damage the tank even when a direct hit is obtained. Fire from light artillery should not cause a medium tank to change its general position nor should it slow its advance. The

exceptions to the above are: a direct hit through an open turret will render the crew incapable of further action; a direct hit on the outside of the tank when a member of its crew has his head out will eliminate that person; and a direct hit on the suspension system may damage it enough to compel the tank to withdraw. All of the foregoing hits, however, are rare and extremely difficult to achieve.

Artillery of 155-mm caliber and above will, if a direct hit is obtained, knock out the crew and seriously damage a medium tank of the *M46* type. Here again, however, we are confronted with the difficult task of obtaining a direct hit when indirect fire methods are employed. Unless the tanks are road-bound, at a halt, caught in a defile, or bogged down in soft ground, normal forward movement or other evasive action should suffice in preventing a direct hit. This does not, however, take into account the effectiveness of massing an excessive number of battalions of artillery on a small area, but is based on the fire of the normal number of battalions likely to be encountered on the average front.

Air.—The employment of air power against tanks, although productive of effective results in both World War II and Korea, has very definite limitations. First, there must be a fair degree of air superiority. Second, there must be favorable weather to provide necessary visibility. Third, assuming that the above two conditions exist, the plane must find the target while moving at tremendous rates of speed at great heights, descend on the target which can take evasive action, ignore antiaircraft artillery in the area, and obtain a close hit with bombs or a direct hit with rockets. Once again, if our tanks are road-bound, caught in a defile, bogged in soft ground, or otherwise immobilized, and other favorable conditions exist for the use of air, then air is capable of rendering ineffective tanks so caught. When the above conditions do not exist, air attacks are not likely to stop a determined effort by tanks in mass.

AT gun.—The AT gun received a tremendous amount of publicity during World War II, with particular emphasis on the German 88-mm dual-purpose gun. This weapon attained its fame as a result of its employment by Rommel's *Afrika Korps* on two separate occasions. First, in the Libyan Desert against the British, and second, against the Americans at Sidi-bou-Sid in North Africa. On both occasions, the Germans achieved complete tactical surprise. They led the Allied tank forces into a trap, and then sprung it from three sides. Surprise, then, is one condition necessary for the effective use of the AT gun and, in the above-mentioned instances, mass also was present.

Under normal battle conditions, the foregoing can be avoided by, first, detailed and accurate reconnaissance; second, providing flank protection; third, the echelonment of the tank force to one or both flanks; fourth, a reconnaissance by fire of likely AT gun emplacements; and fifth, close covering fire by follow-up echelons of the tank force. The sixth, and most important method of reducing the effectiveness of AT fire results from the close co-ordination of the tank force with its supporting artillery to provide for heavy artillery preparations prior to the attack, the use of smoke to protect its flanks during the attack, and the use of forward observers to effect quick adjustments once the enemy's AT guns have fired. The AT gun is the least to be feared of all AT weapons, if the steps outlined above are adhered to carefully. During battle, when the gun is fired, its position is exposed. With its position exposed, machine gun and high explosive fire from covering tanks and artillery should dispose quickly of the gun crew

since they do not have the benefit of armored protection. On the other hand, give these same AT guns the armored protection of a tank and they could, if properly employed, hold up an attack for a considerable period.

The bazooka.—Continued research and development has increased materially the effectiveness of this weapon since World War II. The new 3.5-inch bazooka, which was given its first battle tests in Korea, can knock out any known tank. When first used in Korea against the Russian-built *T34*, it achieved formidable results—seven rounds fired, seven tanks knocked out. Here we have an AT weapon which can go any place an infantryman can go, and it only requires a crew of two to operate it. The natural question then is: "Is not this weapon the answer to the tank?" The answer, unfortunately, is no. While it is of extreme value to infantry and airborne troops, once again specialized conditions are required for its use. These specialized conditions are a result primarily of technical limitations in the weapon itself, namely range and accuracy.

Although the range of the 3.5-inch bazooka is more than 100 yards, anything over that distance reduces materially the accuracy of the weapon. To be sure of an effective hit, the operators must wait until a tank is well within this 100-yard range. Then, in order to fire at a tank, the weapon crew must expose themselves and, in so doing, they become vulnerable to the fire of supporting infantry, other tanks, and artillery, particularly artillery employing the variable time (VT) fuze. All this presupposes that these same crews have survived the initial artillery preparation laid down by the enemy. The ultimate in courage and intestinal fortitude is going to be required of men who will sit in their foxholes and wait for tanks to rumble into range.

Here again the bazooka, like the AT gun, finds its greatest limitation in the vulnerability of its unprotected crew. In addition, its doubtful accuracy, except at minimum ranges, is another handicap to its effective use.

Before leaving the bazooka, it should be mentioned that the shaped charge principle, used in projectiles fired by that weapon, is also employed in the projectiles of other weapons organic to the infantry division, such as the 57-mm and 75-mm recoilless rifle, and the 105-mm artillery piece. Although these latter weapons are capable of bringing a tank under fire at a much greater range than the bazooka, they do not possess the accuracy of the obsolescent AT gun and, in addition, the projectiles have technical deficiencies which are being remedied. It is possible that continued research will ultimately perfect a portable one-man weapon which will use a shaped charge projectile and which will be effective against the present-day tank at ranges of 1,000 to 2,000 yards. If this happens, the future of the tank is likely to become uncertain. It is well to bear in mind, however, that this same research may also develop a new type of armor plate which will resist effectively the shaped charge.

Mobility and Armor Protection

To link together mobility and armor protection is not as illogical as it might seem at first glance. Although it is true that one contradicts the other, at the same time they also complement each other. A decrease in armored protection, with its consequent reduction in the weight of the tank, also means an increase in tactical speed. Speed, in itself, then becomes a form of protection which will compensate, to a limited extent, for the loss of armored protection. Conversely, an increase in armored protection is a "must" when speed is no longer a factor. However, this will increase the weight of the

tank and results in a loss of speed and mobility.

The resolving of the conflict between the demand for greater armored protection and that for increased mobility is a problem which has occupied the minds of the armored experts ever since the close of World War II. We mention it here since the requirements of the field forces become the basis of drawing-board designs. Infantry commanders must realize that their demands for greater armored protection, if satisfied, will reduce the mobility of the tank and limit its employment. They should weigh carefully, therefore, the advantages which will accrue from increased protection. In making such an estimate, they must also guard against too rapid an acceptance of the opposite theory which fanatically advocates greater mobility and fire power with minimum armored protection. Horse cavalry became obsolete because of the vulnerability of horse and rider to modern weapons. The towed AT gun, except in airborne units, has also been discarded because of the vulnerability of the crew manning it. The tank, too, may become a museum piece if the proponents of greater mobility and less armor go uncurbed. To one who has fought the famous German *Tiger* with the mobile *Sherman* tank and achieved victory, on the basis of a platoon of *Shermans* against one *Tiger*, the spectacle is not pleasant to contemplate. The answer to this vital question probably lies in the trite phrase of "happy medium." We must be wary of either extreme and strive for an intelligent balance between the two. Except for 7 or 8 tons too many, the *M46 (Patton)* tank, which is the tank organic to the infantry division, probably may be the answer.

If we acknowledge, then, that mobility as well as armored protection and great fire power is desirable, of what use is this mobility? Mobility permits the rapid concentration of great fire power at the decisive point on the battlefield. Tanks provide the infantry division with speed, fire power, and mass which, translated from the potential, means terrific shock action. Shock action ensures the rupture of the enemy position and mobility ensures rapid exploitation and pursuit. That, briefly, is armored action. This type of action is not limited to the armored division alone, for it is available to the present-day infantry division. However, it must be understood and used properly. A commander who fails to use this potential speed and power, or who uses it improperly, is failing in his responsibilities to his command.

We have already discussed some of the technical aspects of mobility, and the ordnance expert can give you more information in terms of flotation, slopes, and horsepower-to-weight ratios. But what about the practical aspects? Where can a tank go? What are its limitations as regards terrain? The answer to these important questions cannot, unfortunately, be placed on paper. Judgment in the use of tanks comes, the same as with other weapons, from experience. True experience is gained only on the battlefield. Therefore, commanders who do not have this experience must utilize every opportunity, in peacetime training, to determine the capabilities and limitations of their tanks. If that is done, there will be less tendency to expect too much, as in the last War, or not to demand enough.

There is no question that the cross-country movement of tanks is limited by certain types of terrain. As a result, all too frequently, since the last War, the expression "That is not good tank terrain, so we will hold the tank battalion in reserve" has been heard. Unfortunately, in the majority of instances when the foregoing statement was made, tanks could have been used to achieve decisive results—perhaps with difficulty, but they could have been used. If a commander

waits, for what the average officer considers good tank terrain, to commit his tanks, many a "doughboy" will die needlessly for lack of tank support. Korea was not considered good tank terrain, but the North Koreans nearly won that War with tanks. In Italy, during World War II, the armies of Kesselring had to revise their AT doctrine because the 1st Armored Division, successfully sideslipping the main roads with their strong defenses, used terrain which was considered impassable for tanks. One of the surprising features of the German campaign in Norway was the presence of tanks in the German units driving through the mountains.

Deep ditches, gorges, precipitous gullies, and swamps will block the advance of tanks until some pioneer work is done. But between these terrain extremes and tablelike plains, considerable ground is found which can be negotiated by experienced "tankers," ground which was all too frequently neglected because commanders failed to learn the capabilities of their armor. A word of caution, however, is necessary. There were, also, many commanders in the last War who, through lack of experience, went too far in the opposite direction and expected the impossible from their attached tanks. They assumed that tanks could go anywhere. A graphic illustration of this is found in the battle of San Pietro in the Italian campaign. After repeated infantry attacks had been repulsed with heavy losses, it was decided to try to take the town with armor. There was one main road leading into the town from the United States lines. Once on that road, no tank could get off of it due to its precipitous shoulders. Yet down this road, in a column, was sent a supporting tank company. Only three tanks from that company came back; none ever reached the objective. If you must use a road as an axis of attack, be sure the tanks can get off the road and deploy freely on either side.

The intelligent use of tanks demands an understanding of terrain and its effect on tank mobility. Without this understanding, commanders will waste their armor or fail to use it to the maximum.

Tank-Infantry Combination

The employment of tanks with infantry or infantry with tanks is a subject worthy of much study. Of necessity, therefore, this discussion will be limited to a coverage of those aspects wherein the greatest amount of confusion seems to exist.

Reference to available military textbooks will reveal that tanks should:

1. Provide antitank defense for the infantry.

2. Provide the infantry with direct fire support.

3. Capture and hold ground for the infantry.

4. Execute counterattacks against enemy penetrations.

The foregoing fundamentals governing the general employment of tanks with infantry are sound but, like any other listing of fundamentals, they cannot all be executed simultaneously, nor can one or two of them be stressed continuously to the exclusion of the others. Early in World War II, the tendency among infantry division commanders was to stress, almost entirely, the first two of these fundamentals. Later on, as this concept developed weaknesses, there was a trend toward the adoption of the third fundamental in which the tanks were expected to do everything without any infantry support.

At the present time, some 5 years after the War, there still seems to be a general lack of agreement as to how tanks and infantry should be employed. When the new infantry division was organized, officers assumed immediately that the tank organization within the division had

solved their problem. The division tank battalion was to be used to capture and hold ground, and the tanks organic to the regiment were to work in the small tank-infantry team. Such an assumption is sound and logical, but it does not provide the complete answer. Adherence to a rule which places the tank in the same continuous role means that the capabilities of the weapon are not being used to the maximum. A commander must know under what conditions to employ a particular organization. This applies whether we are speaking of tanks in the regimental tank company, or in the division and corps tank battalions.

The only tank organizations whose roles are fixed are in reconnaissance units and, in an emergency, they may be employed in other than normal roles.

The tank-infantry team grew up in the hedgerows of Normandy where neither tanks nor infantry could operate without the closely co-ordinated assistance of the other. Because of the terrain, and the defenses prepared by the Germans, the infantry squad or platoon with two tanks attached was the most efficient way to solve the tactical problem presented. While such conditions will be found in a future war, care must be taken that this role (for the tank) is not continued beyond the point for which it is needed.

The small tank-infantry team is appropriate under certain specialized conditions. These are the breaching of a fortified line, the attack of strongly prepared positions covered by deep mine fields, or attacks in wooded areas and towns. When we are fighting in open country and over good terrain, such a combination should be avoided. If this is not done, then the mobility and speed of the tank is lost, for it is slowed to the pace of the infantry and becomes extremely vulnerable to the fire of enemy tanks and self-propelled guns. For this reason, it is well for a division commander to anticipate such engagements, such as the attack of a fortified line, and ask for the attachment of a tank battalion from the corps tank group. These are heavy tanks which can withstand great punishment and deal more effectively with enemy pillboxes and armor. The infantry division tank battalion then can be employed more appropriately after the line has been breached, instead of being forced to dissipate its efforts in a role for which it is not best suited.

Under conditions other than those discussed in the preceding paragraph, armor should be used to lead the attack and, because of its speed, take objectives before the enemy can react, or by shock action if the enemy has already reacted. Such an action, however, as an infantry attack, must be planned and co-ordinated in detail. Artillery, air, engineer, and infantry actions must be fitted into the picture. Artillery and air provide the preliminary preparation, the support during the attack, and flank protection when needed, while the infantry moves up fast to relieve the tanks on the objective so the armor can continue the attack. At the same time, infantry cannot follow the armor too closely or they will come under the artillery fire which tanks always seem to draw. Neither can they be too far back or they will have to fight by-passed and overrun enemy infantry.

The danger in the separation of tanks and infantry is not, as many officers believe, the vulnerability of tanks without infantry but the vulnerability of infantry without tanks. In relatively open country (not jungle or woods), tanks can defend themselves with little difficulty as long as daylight lasts. The problem for the infantry element, therefore, is to stay as close to the armor as is necessary for their own protection and no closer. Let the tanks do the fighting while the infantry relieves on the objective and provides a harbor at night.

The latter is necessary, if tanks are to operate efficiently the next day.

Commanders of infantry regiments must remember that it is not always necessary to assign a platoon of tanks to each infantry battalion. Many times, more decisive results can be obtained by employing the tank company, in mass, as the main effort. But, in so doing, it must be realized that tanks, to work in a purely tank team, must be trained for that role. Armored troops who have been trained to work in company and battalion tank formations can, with minimum training, revert quickly to the role of supporting the infantry as part of the small tank-infantry team. Those troops, however, which have been trained to work in the small tank-infantry team cannot, without considerable training, operate with any degree of assurance in pure tank formations. Training doctrine should, therefore, stress both roles for *all* the troops assigned to tank units in the division since, in the final analysis, each has its own peculiar techniques.

Underlying any discussion on the employment of tanks with infantry must be the understanding that the tank is a powerful weapon that was made to fight. Despite the fact that its employment may be limited by obstacles, ditches, AT mines, and other tanks, most of the time it can be used where the infantry cannot go without suffering prohibitive casualties. At Anzio, the 1st Armored Division broke out of the beachhead successfully with only minimum casualties as compared with the heavy casualties sustained by adjacent infantry divisions. Therefore, whether you use the tanks in the first wave of an assault or use them as part of the tank-infantry team, be sure you use them whenever possible. They will reduce your infantry casualties.

Tanks are a powerful reserve and lend security to any attack, but they are of little value to anyone if the commander always keeps them in reserve or holds them back for AT defense. No matter the source of tanks under your command, look upon them *whenever possible* as a weapon to be supported, not a support weapon. If conditions do not justify tanks as the primary assault weapon, then use them in support of the assault. Return them, however, to the role of the weapon to be supported as quickly as possible.

Finally, this subject cannot be concluded without considering briefly the use of the tanks of the infantry division on the defense. Here, again, arises a conflict between those who wish to stress the close-support role of the tank (a mobile pillbox), and those who believe that tanks should be used more in the counterattack. The present organization of the infantry division lends itself nicely to the accomplishment of both of these roles. The tanks organic to the infantry regiment might be used to deepen the AT defenses of the battle position, and the division tank battalion employed in a counterattack role. It must be realized, however, that if the tanks are employed in the forward defense areas to provide AT defense, full advantage is not being taken of their mobility. Whenever possible, even at the regimental level, mine fields and obstacles should be used to provide AT protection and the tanks should be held back to provide the "punch" of the counterattacking force. While the infantry, generally, cannot move fast enough to launch a counterattack at regimental level, the tanks can.

If tanks are used in forward positions, maximum use of camouflage should be employed. If this is not done, they will be detected early and countermeasures will be taken by the attacking force. Either heavy artillery will be brought to bear on the positions, or the enemy may shift the point of his thrust to another area where the tanks are not in evidence. To avoid this possibility, the forward po-

sitions for each tank should be prepared, using dozers if available. The position should be well camouflaged, but not occupied. The tank to occupy it should stay well back under cover, concealed from observation, ready to move up into firing position at the appropriate moment. Necessary firing data—such as range cards—should be prepared ahead of time. When the enemy armor approaches within 1,000 yards of the position, that is the time to take it under fire. Earlier than that will produce no effective results and will reveal the position of your tanks to the enemy. If the enemy is employing heavy tanks, this range should be reduced to 500 yards. At night, tanks should occupy their prepared positions in the event that the enemy launches a tank-supported night attack. Once again, however, complete firing data must be prepared in advance, if effective hits are to be obtained.

Summary

It is hoped that the foregoing discussion will contribute to a better understanding of the capabilities and limitations of armor. If armor is organic to your command, use its mobility and fire power *whenever conditions permit.* It is a powerful weapon that can hand out and take punishment better than infantry. Do not expect miracles, but do not hold it back where it will rust from lack of use. Whenever possible, place the infantry in support of the tanks. However, when necessary, do not hesitate to use your tanks to support the infantry elements of your command. Finally, to achieve the maximum from your armor, employ it with intelligence and understanding, as you would your infantry and artillery.

It is true that tactical aircraft, antitank mines, rockets, recoilless guns, and other weapons are effective in varying degrees against tanks. But with the possible exception of tactical aircraft—and these only under the prerequisite conditions of favorable weather and air superiority—the tank is still the best weapon against tanks under all conditions of combat. This emphasizes the importance of the Balanced Tank Program which we have now under way.

General J. Lawton Collins

Organization for an Airlift

Lieutenant Colonel William B. Bunker, *Transportation Corps*
Chief, Air Transport Service Division, Office, Chief of Transportation

FROM the start of the Korean hostilities, it was apparent that considerable reliance would have to be placed on aerial transportation to supply the rapidly moving combat elements, and to overcome the deficiences of other means of transportation. The campaign continued, to a large measure, to be dependent upon air transportation, particularly in the northern areas where a lack of seaports made it one of the most important mediums of supply.

When the campaign started, there was no logistical organization in the theater for the operation of aerial ports of embarkation. At Matsashima, an Air Transportability Training Center had been organized from the 11th Airborne Parachute Training Center to give tactical air-transportability training to Eighth Army units. This organization was an Eighth Army school, under the supervision of its G3, and its instruction emphasized, primarily, airborne doctrine concerned with teaching units to load their own equipment and supplies into aircraft as well as the proper method of unloading the matériel. In order to establish an aerial transportation system, the Air Transportability Training Center was attached to the 374th Troop Carrier Wing. Detachments of the center were set up at the Tachikawa, Brady, and Ashiya Air Force Bases and were charged with the dual mission of loading and unloading aircraft and of conducting aerial resupply.

During the first 2 months of the campaign, the center operated in this manner, primarily in the status of an air freight terminal on the air base. It is interesting to note that, during this same period, the Ashiya Detachment conducted five or six aerial resupply drops to units which had been isolated in the retreat to the Pusan perimeter.

Combat Cargo Command Established

When the rear area logistical elements of the Eighth Army were combined into the Japan Logistical Command, General Headquarters directed it to assume the responsibility for the operation of the aerial ports of embarkation established within Japan, and the operating detachments of the Air Transportability Training Center were transferred to its command. At this time, the general nature of the airlift was changed from that of tactical support to that of a logistical supply medium for the forces in Korea. Several additional units, notably the 314th Troop Carrier Group and the 46th and 21st Squadrons, were added to the airlift and a command echelon for their opera-

A system of allocating priorities, the scheduling of the work load to provide maximum effectiveness, and its establishment as a major command are three prerequisites for an efficient airlift organization

tion, the Combat Cargo Command, was established directly under Headquarters, Far East Air Force. In order to handle this change in concept, it became necessary for the Japan Logistical Command to organize complete aerial ports of embarkation and the necessary command structure to handle its responsibility.

A New Command Structure

Under the Japan Logistical Command, the Air Transportability Training Center was assigned the additional mission of operating the required aerial ports of embarkation. The technical supervision of this operation was delegated to the Transportation Officer of the Japan Logistical Command who added an Air Division to his organization to handle this responsibility.

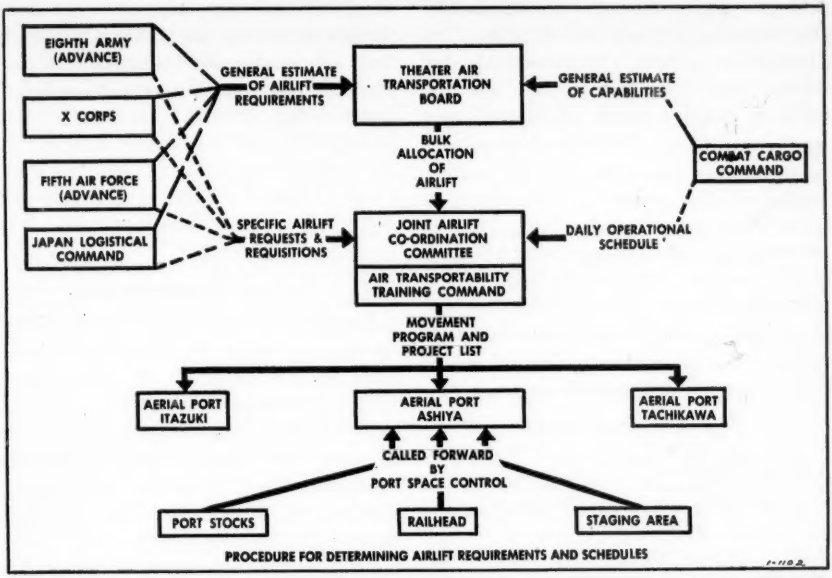
The Air Division, Japan Logistical Command, primarily was concerned with representing the Air Transportability Training Center in dealings with the various staff divisions of the Japan Logistical Command, particularly in the matter of co-ordinating the flow of supplies and equipment, to be air-transported, to the various ports of embarkation to meet forecasted airlifts. It was also responsible for keeping the Air Transportability Training Center advised as to the policies and requirements of both the Japan Logistical Command and General Headquarters for the use of the airlift, and the general allocation of priorities. Because of the geographical situation, the Air Division also took action directly with Tachikawa Air Force Base to release cargo for the airlift shuttle service for inter-Japan moves.

The Air Transportability Training Center Headquarters was established at the Ashiya Air Force Base, in the same location as the Combat Cargo Command. This was necessary in order that the over-all operational plans of the Combat Cargo Command and those of the aerial ports could be integrated daily. In addition, the Commanding Officer, Air Transportability Training Center, also acted as the Japan Logistical Command representative to the Combat Cargo Command on matters of mutual interest.

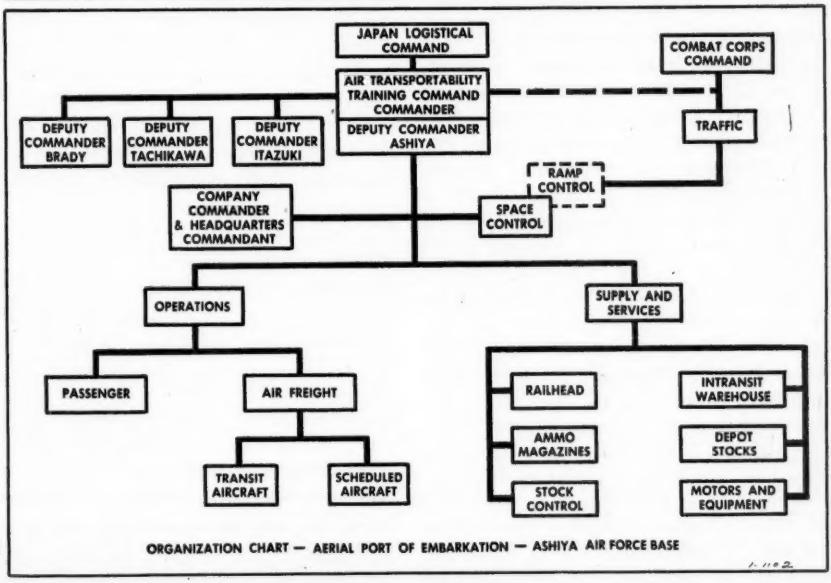
Aerial Ports

Aerial ports of the Air Transportability Training Center were established at Ashiya, Tachikawa, Itazuki, and Brady airfields. Their detailed organization varied considerably, between the several airfields, due to the number of aircraft based there and other local conditions. At Tachikawa Air Force Base, which had been an aerial port for a considerable time, the army headquarters was superimposed on the existing air force organization, and the detailed operations were performed by the same personnel as had been operating the Air Force Air Freight and Passenger Sections. This was considered desirable inasmuch as port-type operations there would continue after the cessation of the campaign and the base commander was reluctant to have his personnel temporarily dispossessed and then have to replace them when the army port was withdrawn. At the Brady airfield, the operation was quite small since the aircraft based there, *C-47s*, were used only in the minor local lifts and as couriers. At Itazuki, the establishment, likewise, was small since the already existing air freight operation of the Fifth Air Force and the Air Evacuation Squadron, at this field, continued to handle most of the port work.

The Ashiya Air Force Base, which was responsible for supplying a major portion of the airlift from Japan to Korean stations, was completely organized as a ground force operated aerial port of embarkation. The organization was divided



PROCEDURE FOR DETERMINING AIRLIFT REQUIREMENTS AND SCHEDULES



ORGANIZATION CHART — AERIAL PORT OF EMBARKATION — ASHIYA AIR FORCE BASE

into two main divisions, an Operations Division and a Supply and Facilities Division. The former was responsible for loading and unloading aircraft and for handling cargo between the aircraft and warehouse hangars. The latter was responsible for the operation of marshalling camps, supply points, and ammunition magazines and other facilities for the stock-piling of airlift supplies. In addition, it was charged with the operation of the railhead, the stock control of intransit and stock-piled materials, and the operation and maintenance of the mechanical equipment required by the port.

Space Control Officer

Co-ordination between the activities of the Operations and the Supply and Facilities Divisions was obtained by establishing a Space Control Section as an executive function of the port commander. The Space Control Officer was responsible for establishing the loading program for the Operations Division, including the documentation of shipments and maintenance of records of aircraft being loaded and time of loading. The Space Control Officer also was the point of contact between the port and air force operations. Working directly with the Combat Cargo Command Ramp Control Officer, he received information as to the aircraft to be loaded, allowable loads, and other operating instructions. He, in turn, advised the air force operations personnel, through the Ramp Control Officer, of the load which was being placed aboard the aircraft, its destination, and the time it would be available for take off. By working closely with the Supply and Facilities Division, he programmed daily movement schedules in order to take advantage, insofar as possible, of movements directly from the railhead to aircraft, thereby avoiding double handling of intransit cargo. Since there were no designated passenger flights in this operation, the Space Control Officer was responsible for keeping in close contact with the Passenger Section to ensure that aircraft, as required, for passengers were made available and for contacting the groups, through the Ramp Control Office, in order that proper personal safety equipment could be placed aboard the aircraft.

Air Shipment Priorities

Priorities for air shipment to Korea were prescribed by the General Headquarters Air Priorities Board. The Combat Cargo Command submitted a weekly estimate of its capabilities for transport to various Korean areas and, at the same time, the major commands in Japan and Korea submitted their estimates of requirements for airlift for the ensuing week. Based on these data, the theater Air Priorities Board issued a bulk tonnage allocation to each major command on a weekly basis, leaving to the Commanding Officer, Air Transportability Training Center, the prerogative of making daily adjustments between claimants and the responsibility for the collection of detailed requirements.

A daily program meeting was held at Combat Cargo Command headquarters, attended by representatives of the claimant shippers, the Air Force, and the Air Transportability Training Center operations staffs. * At this time, a project list for airlift for the following day was formulated, within the broad allocation framework, giving detailed assignments by aircraft types and destinations for the lift required. This list became a movement

* This procedure established an informal operating agency designated the Joint Airlift Co-ordinating Committee which, using the bulk allocations of the theater, considered specific airlift requirements and the air force and aerial port operating capabilities.

directive to the space control officers for their next day's operation. At this meeting, local arrangements were made, when required, between the claimants' representatives to meet urgent requirements and operational restrictions. Because of the time element and the rapidly changing situation, quite frequently the program bore little or no relation to the general priorities allocation pattern.

The Space Control Officer was responsible for keeping the Air Transportability Training Center commander currently advised as to the availability of cargo or units for air shipment so that he could request their inclusion in the daily program. Upon receipt of the daily program, the Space Control Officer then prepared his detailed schedule of operations in conjunction with operations and supply officers. He took the necessary action to have units alerted and available for loading. The Supply and Facilities Division Officer then arranged for railhead operations in order to meet the detailed program of outloading and prepared mobile loads, on trucks, for the program.

Plane Loading Procedures

The Ramp Control Officer secured from the operating groups the numbers and the locations of aircraft available for loading, and advised the Space Control Officer who entered them on his space control record. The Space Control Officer then assigned one of his programmed loads to the aircraft and advised the Operations Officer. Actual loading operations were conducted by teams consisting of a noncommissioned officer loading foreman, a noncommissioned officer checker, and 10 Japanese laborers. Since only small 2-ton (Japanese built) trucks were available, three truck loads were required for most aircraft. This team, together with forklift trucks or other materials handling equipment required by the particular load in question, was dispatched to the plane sites by the Operations Officer together with two copies of a prepared manifest of the load.

The port loading team was fully responsible for the loading and the lashing of cargo, and then turned a copy of the manifest over to a representative of the plane crew who was stationed at the aircraft during loading operations. Loading operations were supervised by two ramp officers of the Operations Division who cruised the loading area in jeeps. It was discovered that their effectiveness was increased considerably by issuing them radio-equipped jeeps so that they were in constant contact with the operations desk. The average time for loading and lashing general cargo aboard a plane was approximately 40 minutes, and the objective of the port was to have every aircraft loaded at least 30 minutes prior to its scheduled departure.

After loading, the crew returned to the space control headquarters and turned back a copy of the manifest, indicating the time the loading was completed, signed by the noncommissioned officer in charge of the loading operation. The time of loading indicated on the space control records, however, was shown as the entire time between the dispatch and return of the crew or the time the aircraft was held by the port operations.

Operational Responsibilities

As the authority of the Japan Logistical Command was restricted to the Japanese Islands, and as personnel for port operations was seriously limited through most of the campaign, the Air Transportability Training Center did not supply

personnel for the operation of the airheads. The Combat Cargo Command formed provisional support units from its own personnel, consisting of 4 or 5 officers and 50 to 100 enlisted men, to operate the ports of debarkation. These units were equipped with essential equipment by drawing from the air base and the Fifth Air Force. After the situation had been stabilized somewhat, responsibility for the ports of debarkation operation was assigned, by General Headquarters directive, to the ground force commands functioning in these areas.

During the initial operations at every airhead, the supplies being shipped were in such demand that the tactical units being served were quite willing to assist in unloading and clearing the airfield. After the situation stabilized, however, some difficulty was experienced in securing support for the operations of the airfield. This became particularly apparent when one of the Korean airheads was changed to a port of embarkation to serve another more advanced field.

In view of the close relationship between the activities of aerial ports of embarkation and debarkation served by the same transport command, and the direct interrelationship of volume of traffic between the fields, it appears that the operation would have been improved considerably had the Air Transportability Training Center been assigned the mission of operating all aerial ports of embarkation and debarkation served by the Combat Cargo Command. Further, the command relationship between the Army and the Air Force for this operation would have been improved considerably if the Air Transportability Training Center were placed on a level parallel to the Combat Cargo Command as a major command in the theater, rather than on a local level for each area.

Conclusion

Of the factors effecting, most seriously, the efficient utilization of the available air transportation, the most important was, undoubtedly, a complete absence of an efficient method of determining priorities. All shipments and requisitions were marked and sponsored as "first priority," which forced the Air Transportability Training Center commander to make his own decision as to the relative urgency of each shipment when weather, diversions, or other factors decreased the total available airlift. While, normally, the airlift is reserved for high priority shipments, it is still perfectly feasible to ascribe a relative degree of urgency so that the port may expedite the proper item for shipment. In this same connection, requirements for airlift, particularly from the Army, fluctuated violently, and while it often required several times its assigned allocation, at other times it could not use the available lift.

There seemed to be a general lack of appreciation, in Army supply agencies, of the necessity for maintaining the air transportation system at or near peak production in order to ensure its instant availability for high priority shipments in emergencies. Precision pattern flying requires continuous operation. in order that procedures and air traffic patterns can be stabilized and flying personnel retain a high degree of efficiency. In the same manner, the aerial ports must have a fairly uniform work load, requiring near maximum exertion, in order to be able, instantly, to meet emergency developments. If air transportation is reserved entirely for emergency shipments of the first priority, a sudden unforeseen emergency will find the system either in disuse or already loaded to capacity and, in neither case, will it be able to react instantly to meet the new requirements.

In addition to emergency requirements, supply agencies should have an airlift

program of lower priority which will use the air transportation system for decreasing stock piles and pipe-line inventories of high unit value supplies, such as medical and signal equipment. This program then will serve as a base load factor which can be used to absorb the slack between peak emergency requirements and thereby keep the system operating smoothly between emergencies.

The success of our ground operations in any future war will depend more than ever before upon the degree of air support that is provided. Given air transports in sufficient quantity, our infantry divisions can assume greater strategic importance in the far-flung operations of a global war. With the necessary gliders and other specialized equipment, our airborne divisions can go over the enemy's lines to strike vital targets which otherwise could be taken only at great loss in men and equipment. And with the increased fire power afforded by tactical air support to isolate the enemy and drive him to cover, our ground units can gain the freedom of movement quickly to overcome the enemy.

General J. Lawton Collins

An efficient army cannot be a static organism. Its evolution must keep pace with and is, in large part, dependent upon constantly evolving changes in the industrial, scientific, social, and political fields. Adherence to outmoded tools, methods, and organization spells obsolescence, one of the most insidious and at the same time one of the most disabling diseases that can attack an army.

General of the Army Douglas MacArthur

Some Accomplishments of Unification in the Field of Logistics

Colonel Alfred B. Denniston, *Quartermaster Corps*
Instructor, Army War College

The views expressed in this article are the author's and are not necessarily those of the Department of the Army, the Army War College, or the Command and General Staff College.

This is the second of a series of two articles on the subject mentioned above. The first article appeared in the March 1951 issue.—The Editor.

Cataloging

THE area of cataloging probably provides more opportunity for increasing the effectiveness of the logistic systems within the Department of Defense than any other. This is also an area in which there is no difference of opinion among the three military departments, or between them and the other elements of the Federal Government, as to the goal toward which all are striving. That goal is "to assure that each item of supply used, purchased, stocked, or distributed (throughout the Federal Government) will be identified under one name and description, assigned only one identification number, and classified in but one class of a commodity classification system."

Further, and perhaps more important, agreement as to the name, description, and number given an item is much easier to achieve than is a decision as to which one of three or more similar items will be selected for standardization. The Navy was quite willing to call a *swab* a *mop*, and the Army a *mop* a *swab*. The Air Force held itself aloof from such a mundane controversy. I believe *mop* became the unified name adopted.

This is not to state or even to infer that there have not been disagreements as to how to proceed in this field. There have been differences, but these have been on procedural, timing, and implementation problems and not on problems of principle. Many people believed that the program could be rushed faster than the operating agencies, who had to do the work in addition to their other duties, felt was possible. All now agree that a completion date of 30 June 1952 is reasonable and can be met.

The implementation of this program, that is the introduction of the new names, descriptions, and numbers into the purchase, transportation, stock control, and other operations of the agencies of the Federal Government, is a matter on which there is still some disagreement. Opinions as to the ease with which this can be done vary as the cube of the distance from which the observer views the problem. One of the most eminent authorities on cataloging thinks it will take 20 years. Others, not so close to the problem, think it can be done overnight.

I will not go into the history of Federal cataloging except to indicate that it is not a new idea. The Congress authorized a Federal Standard Stock Catalog

in the Navy Supply Bill approved on 2 March 1929. This catalog, and its departmental supplements, contained at its peak a net of 230,000 items out of an estimated total of 3,000,000 items in use by all agencies of the Federal Government. President Franklin D. Roosevelt, on 18 January 1945, directed the preparation of a United States Standard Commodity Catalog. President Harry S. Truman reaffirmed this directive on 12 July 1946. The Army-Navy Munitions Board established a catalog agency on 3 July 1947. The Munitions Board re-established this agency as the Munitions Board Catalog Agency on 11 May 1948. House Concurrent Resolution 97, 81st Congress, 2d Session, requires the Secretary of Defense and the Administrator of General Services to develop a co-ordinated cataloging plan for the Federal Government.

Secretaries of Defense, James V. Forrestal and Louis A. Johnson, in strongly worded directives to the three military departments, emphasized the importance of the cataloging program and directed that it be strongly supported. On 19 July 1950, Mr. Jess Larson, Administrator of General Services, delegated to the Secretary of Defense, with power to redelegate to the Chairman of the Munitions Board, his authority to develop a uniform Federal Supply Catalog System. The Munitions Board in turn, on 21 July 1950, rechartered the Munitions Board Cataloging Agency with authority and organization commensurate with its more clearly and firmly established responsibilities.

The responsibility and authority for the development of a Federal Supply Catalog System having been nailed down firmly by the President, the Congress, the Administrator of General Services, the Secretary of Defense, and the Chairman of the Munitions Board, we should look for a moment at the organization provided to carry out this responsibility and to exercise this authority. The first echelon of this organization is the Munitions Board Cataloging Agency Policy Council which assists and advises the Director of Supply Management of the Munitions Board in cataloging matters. This council consists of the Director of Supply Management, the flag or general officer of each of the three military departments who is responsible for cataloging progress in his department, and a ranking member of the staff of the Administrator of General Services.

The second echelon of this organization is the Munitions Board Cataloging Agency. This agency consists of a full-time director who must be an officer from one of the three services with the rank equivalent to that of a colonel or higher, a full-time deputy director who can be a civilian or an officer from one of the services with rank equivalent to that of a lieutenant colonel, a full-time staff, and a part-time advisory group. The advisory group consists of one member and one alternate appointed from each of the three departments, and one member and one alternate appointed by the Administrator of General Services.

One of the best ways to get the most from each service dollar is to further the concept of co-operation among the three services. It is in the field of logistics that the greatest tangible benefits will accrue

It should be re-emphasized at this point that, while the organization described above has the responsibility and commensurate authority to develop plans and programs, co-ordinate the cataloging efforts of the elements of the Federal Govern-

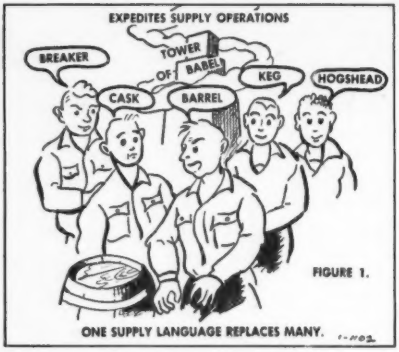


FIGURE 1.

ment, and make final decisions, it does not and cannot produce the pick-and-shovel data required to construct the uniform Federal Supply Catalog System. This data does and must come from the co-ordinated work of the bureaus of the Navy, the technical services of the Army, the Air Matériel Command of the Air Force, and all the civilian agencies of the Federal Government.

In my opinion, the development of a Federal Government and not just a Department of Defense unified plan, program, and organization for the development of a uniform supply catalog system outweighs all other accomplishments in this field.

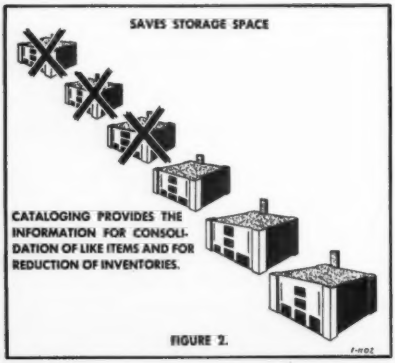

SAVES STORAGE SPACE
CATALOGING PROVIDES THE INFORMATION FOR CONSOLIDATION OF LIKE ITEMS AND FOR REDUCTION OF INVENTORIES.

FIGURE 2.

There have been, however, some accomplishments which can be portrayed statistically. The accomplishment of the objective of a uniform supply catalog system requires the formulation of two basic products. These are:

1. *Description patterns.*—This term defines the document which lists the generic characteristics of the items covered by the pattern. Obviously, all items do not have the same characteristics. For example, a significant characteristic of lumber is its cross-sectional dimensions, which are not at all pertinent to the description of machine parts. A group of items having

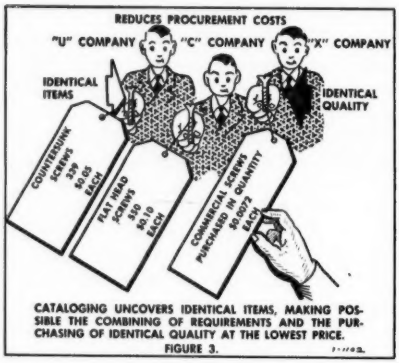

REDUCES PROCUREMENT COSTS
"U" COMPANY
"C" COMPANY
"X" COMPANY
IDENTICAL ITEMS
IDENTICAL QUALITY
COUNTERSUNK SCREWS 339 $0.05 EACH
FLAT HEAD SCREWS 510 $0.10 EACH
COMMERCIAL SCREWS PURCHASED IN QUANTITY $0.0073 EACH
CATALOGING UNCOVERS IDENTICAL ITEMS, MAKING POSSIBLE THE COMBINING OF REQUIREMENTS AND THE PURCHASING OF IDENTICAL QUALITY AT THE LOWEST PRICE.

FIGURE 3.

essentially the same general characteristics should be described in terms of these same characteristics; otherwise, the similarity and the differences of the items will not be apparent. Furthermore, all the characteristics of the group of items which are significant for supply operations should be covered in a description pattern, so that each item may be fully described by use of the appropriate description pattern.

2. *Item descriptions.*—These consist of the minimum amount of identification data necessary to differentiate an item from all other similar items, plus reference data which adds to the knowledge and understanding of the item and provides

additional catalog data which may be useful in supply operations or necessary in determining the classification of the item.

Figure 4 shows the total production of description patterns to date and includes the number of such patterns formulated each month for Fiscal Year 1950. Figure 5 portrays the same data for item descriptions. The best current estimate is that the complete operation will require about 2,500,000 military item descriptions. I believe that the current number being produced each month is far more important than the total production, and that both sets of data indicate healthy production schedules.

Perhaps I overemphasize the importance of the cataloging program. Perhaps the benefits steming from it are visionary, but I cannot help thinking that if the tank battalion supply officer and the supply officer of a landing ship, tank (LST) had known of the common parts in their respective vehicles, cross-servicing at Omaha Beach would have been much less difficult. Cross-servicing, without common identification of items through uniform cataloging, is a hit-or-miss, hunt-and-peck operation. When common identification becomes a fact, cross-servicing will have advanced to the "touch system" stage.

While considerable attention has been devoted to the area of cataloging, the surface has been barely scratched. For those who wish to understand this program fully, and that should include all military personnel concerned with supply matters, I recommend two publications. They are: *Introduction to the Cataloging Program*, Munitions Board, May 1950, and *Joint Report to Congress on the Federal Catalog Program*, Munitions Board and General Services Administration, August 1950.

DESCRIPTION PATTERNS
(Monthly Progress)

FY 1950	*Received*	*Approved*	*Published*
Jul 1949	55	0	156
Aug 1949	40	7	0
Sep 1949	120	79	0
Oct 1949	165	169	176
Nov 1949	186	172	52
Dec 1949	133	170	195
Jan 1950	248	164	78
Feb 1950	227	189	86
Mar 1950	267	332	200
Apr 1950	169	178	-1
May 1950	260	174	181
Jun 1950	269	263	284
TOTAL—FY 1950	2,139	1,897	1,407
TOTAL—FY 1949	604	476	144
GRAND TOTALS	2,743	2,373	1,551

FIGURE 4.

Finance

In the area of finance there have been

some highly effective "unification" accomplishments. Probably, most of these are unknown except to finance, audit, and disbursing personnel of the services but some of them affect us all. Do you know that a firm basis has been established for the complete integration of procedures relating to pay matters throughout the Department of Defense? The Army's new pay system basically is similar to that used by the Navy, Marine Corps, and Air Force. The "Career Compensation Act" puts all the uniformed services on the same pay and allowance basis. Cross-auditing of industrial accounts is done by one service for one or both of the other services in areas where the requiring service or services do not have audit personnel stationed.

In the operation of commercial accounts, that is the collection of what is due the Government and the disbursment of funds to pay obligations, cross-servicing is progressing on a sound basis through the establishment of a pilot project at the Norfolk Finance Office, United States Army, Fortress Monroe, Virginia. When the results of this project have been evaluated, cross-servicing in these operations can be established on a practical, realistic basis to the degree that is indicated as beneficial.

Tests of property accounting on a dollar-wise basis are being conducted at the Granite City Engineer Depot, Illinois. If these tests prove successful, it is anticipated that this system of property accounting will be instituted, eventually, throughout the Department of Defense.

In the area of budget making, it is anticipated that the Army will adopt the much heralded performance type budget similar to that now used by the Air Force and the Navy.

ITEM DESCRIPTIONS
(Monthly Progress)

FY 1950	*Received*	*Approved*	*Published*
Jul 1949	3,053	0	560
Aug 1949	9,571	3,532	8,763
Sep 1949	18,459	2,907	24,191
Oct 1949	35,500	26,567	13,783
Nov 1949	59,738	67,036	20,975
Dec 1949	81,970	81,767	15,130
Jan 1950	75,004	114,766	10,208
Feb 1950	92,510	54,941	15,414
Mar 1950	103,509	71,073	12,709
Apr 1[illegible]	91,881	140,491	22,748
May 1950	100,170	80,314	16,933
Jun 1950	68,140	81,588	37,561
TOTAL—FY 1950	739,505	724,982	198,975
TOTAL—FY 1949	192,111	152,093	16,243
GRAND TOTALS	931,616	877,075	215,218

FIGURE 5.

Supply Distribution

Distribution includes the handling and control of supplies from their receipt in the military supply system to their ultimate disposition. Before you can determine

accomplishments or gauge progress you must know what you are trying to accomplish and define clearly the goal to be reached. It appears to me that there is considerable confusion on this point. Perhaps the most authoritative means of making the goal unmistakable is to quote pertinent parts of a directive issued by the Secretary of Defense, on 17 November 1949, to the Secretaries of the Army, Navy, and Air Force; the Joint Chiefs of Staff; and the Chairman of the Munitions Board and the Research and Development Board. This directive, titled "The Department of Defense Supply System," summarizes the lessons learned in more than 2 years of experience in developing a sound basis for proper and useful unification in the area of supply. It states in part:

> The Munitions Board will develop, in keeping with the pattern of organization . . . and the assignment of logistic responsibilities by the Joint Chiefs of Staff, a supply system for the Department of Defense. This supply system will be common to the three military departments in that common policies, standards, and procedures will be established throughout the Department of Defense to the extent permitted by variations in (a) the roles and missions assigned to combat forces, (b) the nature of the types of material being controlled, and (c) the state of development of the elements of the system.
>
> Each of the three military departments will man and operate a supply system. The mission of each departmental supply system will be twofold: (a) the furnishing of supplies to the combat and service components of that department; (b) the furnishing of supplies, on a cross-servicing (or other agreed upon) basis to the combat and service components of the other departments.

Enclosed with this directive is a set of 19 assumptions developed by the Munitions Board, the Joint Chiefs of Staff, and the three military departments and approved by the Secretary of Defense. I recommend that those who wish to understand the unification process in the area of supply should study this directive.

The first point I want to underline is that *each* military department is to operate a supply system. The second point of importance is that these three supply systems will be so organized as to complement and supplement each other to a maximum degree.

In implementing this directive, the Munitions Board has developed or revised 13 programs which, when fully effected, will give the Department of Defense the supply system envisioned by the Secretary of Defense. These programs, some of which have been previously described, are:

1. Military Standardization.
2. Preservation, Packaging, and Packing.
3. Cataloging.
4. Purchase Assignment.
5. Purchase Policies and Procedures.
6. Military-Contractor Relationship.
7. Material Inspection.
8. Material Control.
9. Transportation.
10. Material Storage.
11. Distribution Policy.
12. Maintenance.
13. Requirements.

In assessing the specific accomplishments in this area, it is again evident that most of them are comparable to the planning for and erection of the necessary foundation on which the integrated supply system will be built. Of necessity, an initial step was a survey of the three supply systems and a pointing up of the differences in organization and methods among them. In this process, the personnel of each department became familiar with the organization, methods, and problems of the other two departments. The learning of each others nomenclature was a job in itself and often led to the knowledge that those differences were more apparent than real.

The Munitions Board approved, on 28 September 1950, and sent to the departments a policy on interdepartmental supply support which facilitated cross-servicing at all levels. In addition, considerable progress has been made in the development of common conservation and utilization policies especially in regard to materials in critically short supply and

in the often criticized area of property disposal.

Material Storage

In the field of material storage, standard warehousing design criteria have been developed, a general purpose pallet has been approved, and standardization of a special purpose stevedoring pallet is well under way. A Munitions Board Industry Advisory Committee, composed of the outstanding storage and warehousing experts of the Country, has been studying, for 2 years, the problems of the palletization of large caliber ammunition; improving the techniques of the loading and unloading of vessels; and the co-ordination of warehousing and refrigerated warehousing in wartime. Their solutions will be used by all three departments. A joint program, participated in by the three military departments, providing for on-the-job training of military personnel by assigning them to organizations engaged in storage operations has been developed and is in effect.

Transportation

The accomplishments of unification in the area of transportation are more widely known than those in any other area. The successes of the Military Air Transport Service (MATS) in the Berlin Airlift and in the Korean conflict are well-known and need not be discussed further. The Military Sea Transportation Service (MSTS), operated by the Navy for the benefit of all three military departments, has come through its first real test in the Korean operation with flying colors. Responsible Army officials are high in their praise of the manner in which this new service performed the tremendous task of transporting men and supplies to Korea.

A little-known agency, the Joint Military Transportation Committee, has been functioning effectively for some time. This committee, composed of general and flag officers of the Army, Navy, and Air Force, discharges the transportation responsibilities of the Joint Chiefs of Staff.

A new agency in the area of transportation has been established recently by the Secretary of Defense. It is the Military Traffic Service. It will handle the traffic management problems of the Department of Defense. While this agency is quite new, it has already demonstrated that it performs a very useful service in its field.

The Military Traffic Service performs an entirely different type of mission than does MATS and MSTS. Those services operate government owned or leased aircraft and ships, whereas the Military Traffic Service concerns itself with the proper utilization of privately owned and operated transportation mediums for the movement of military personnel and supplies.

Industrial Mobilization

The area of industrial mobilization presents few statistics which can be tabulated to measure exactly the accomplishments which may be credited to "unification." It should be borne in mind that if the previously discussed programs in the areas of procurement, standardization, cataloging, finance, distribution, and transportation do not make major contributions to the improvement of the industrial mobilization process, they must be considered as worse than failures. Since this is an attempt to point out some and not all of the accomplishments, let us look at a few. From these, we may be able to draw conclusions as to whether or not satisfactory progress is being made.

Prior to the enactment of The National Security Act of 1947, there was no agency responsible for planning "military, industrial, and civilian mobilization." This act established the National Security Resources Board and gave it that responsibility. While this agency is outside the

Department of Defense, as it should be, it establishes the over-all framework for and provides the top-level direction of industrial mobilization planning. Previously, this had been, organizationally at least, missing. The act established the Munitions Board within the Department of Defense and gave it the responsibility "to plan for the military aspects of industrial mobilization." Without discussing the virtues or faults of either this board or its predecessor, the Army-Navy Munitions Board, it would not appear to be an overstatement to say that the former is better equipped, with regard to authority, responsibility, and organization, than was its predecessor.

Industrial mobilization is such a broad subject with so many diverse elements that to attempt a brief summary of our progress in it would be apt to do more harm than good. The Munitions Board published, on 17 March 1950, a pamphlet entitled *Department of Defense Industrial Mobilization Program.* I commend that it be read by all persons who wish to know where we stand in this vital undertaking.

In assessing our progress, all informed persons agree that the present unified military industrial mobilization program is far superior to anything available before or even during World War II. The major credit for this improvement is due to the spirit of co-operation which exists among the Army, Navy, Air Force, the civilian agencies of the Government, and industry and labor, all under the leadership of the National Security Resources Board, the Joint Chiefs of Staff, and the Munitions Board.

Conclusion

This has been an attempt to review some of the accomplishments of unification in some of the areas of the broad and complicated field of logistics. Though limited in scope, I believe it covers a fair cross section of that field. It has not been an attempt to sell any particular point of view on a necessarily controversial subject. The temptation is too great to resist pointing out, however, one thing which appears to be self-evident. The fact that progress in some areas has been so much greater than in others indicates that unification in the field of logistics does not lend itself to the "broad-brush" treatment. It must be considered carefully and in detail by selected representatives from the three services who best understand the implications of changes in their fields.

Any discussion of the Army must be prefaced with the statement that the individual soldier is still the most important element on the battlefield. There can be no substitute for him. Since our potential enemies have forces in being much larger than we have, our soldiers must have the maximum effectiveness that our superior scientific and industrial power can provide.

General J. Lawton Collins

Who Blows The Bridges?

Lieutenant Colonel Walden F. Woodward, *Infantry*
Instructor, Command and General Staff College

"I don't know who was supposed to blow the bridge, but it didn't get blown. The tanks came right over it and overran us."—Statement of member, 24th Infantry Division, Korea, July 1950.

IMAGINE that you are the tank platoon commander assisting an infantry battalion defend a bridgehead over the Dalagot River near Zaragoza, Luzon. The date is 30 December 1941. You are authorized to blow the bridge, if necessary, to prevent it from falling into enemy hands. At 0315, an enemy force hits your position. After a severe fight, the enemy withdraws. You decide to withdraw your tanks across the Zaragoza Bridge until daylight. As your last tank reaches the west bank, there is an explosion and your bridge collapses. You investigate immediately to find out who has blown the bridge that only you had authority to destroy. You find that the engineer lieutenant had left the destruction of the bridge to his platoon sergeant and departed for the rear. The platoon sergeant detailed a private for this task and departed with the rest of the men. The private, not to be outdone, found a civilian, instructed him how to light the dynamite, paid him one peso, and then left to join his platoon. The civilian, after hearing the shooting, became excited and blew the bridge.

The infantry, now lacking the tank support on which they were depending, are forced to withdraw across the river during the morning. And you, as tank platoon leader, ponder: *What should I have done?*

Let us now examine another and quite different story which took place in the same general area the following day and night.

The entire Southern Luzon Force was withdrawing into Bataan over the Calumpit Bridge. In addition, a continuous stream of service vehicles was evacuating supplies from Manila. General MacArthur ordered every unit that could be spared to defend this critical bridge. Included were infantry, artillery, tanks, and antiaircraft units. General Jones was placed in command of these troops and given explicit orders to hold the bridge until 0600 1 January. Colonel Skerry, the North Luzon Force Engineer, was made directly responsible for the demolition of the bridge.

During the night of 31 December-1 January, the traffic across the bridge continued. General Wainwright came up and assumed personal command of the situation. About 0500, General Wainwright, at the bridge site, received personally the reports from the various division commanders that their troops were safely across.

At 0545, there being one engineer detachment still on the far bank, General Wainwright extended the time for blowing the bridge to 0615. At dawn, the noise of rifle fire from the south increased. The enemy was nearing the bridge. General Wainwright then turned and said,

"Skerry, blow the bridge." The covering force withdrew to a safe distance and, at 0615, the charges were detonated. The bridge disappeared.

Let us see now if we can develop a sound doctrine to answer the question: Who blows the bridges? There is practically nothing *right* in our first example. The second case was very successful, and was probably the best possible solution under the circumstances. The presence of the force commander and his staff engineer, on the spot, guaranteed a successful operation. But suppose that there are two, or three, or even four, important bridges? What happens then? How *does* a commander or G3 plan for the necessary bridge demolitions in retrograde movements?

The *preparation* of a bridge for demolition to include the firing of the charge is a technical operation, properly assigned to the Corps of Engineers.

The *decisions* to blow the bridge and the exact time for blowing it are tactical decisions for which a commander and his staff must carefully plan and provide. Let us see how this should be done.

Classification

What bridges should be destroyed? The answer here is obvious: all located in terrain that we give up to the enemy. Bridges are seldom, if ever, destroyed by troops who are advancing. However, because of tactical considerations, bridges may be blown on an exposed flank when engaging in a pursuit. We may classify bridges according to the time when they are to be blow as:

Preliminary.—To be blown as soon as security permits.

Deferred.—To be blown as late as safety permits, often in accordance with a detailed plan.

Final.—To be blown at the last possible moment, normally after the last friendly unit has crossed.

Bridges classed as *preliminary* should include the maximum practicable number, and must include those bridges not suitable for final destruction. The latter are bridges which are technically difficult to destroy, such as long viaducts. However, even these bridges should first be classified from a tactical viewpoint. The unit engineer should submit his recommendations for the destruction of all bridges based on technical considerations. The G3, after co-ordinating with the G2 and the G4, should submit his recommended plan for the destruction of all pertinent bridges to the commander which, when approved, is published in the form of an annex to the pertinent operation order.

All other bridges usually will be classed initially as *deferred.* In a case where all but one of the bridges are blown, our embarrassment would be obvious if the enemy succeeded in blocking the roads to that bridge. The commander, however, should plan which bridge(s) should be classified as *final* for the ultimate decision rests with him.

As a retrograde movement progresses, certain bridges will no longer be required. Their demolition should then be ordered at once. Eventually, it will become apparent which of the remaining bridges will be used by our covering forces and outposts. Once this fact emerges, all other *deferred* bridges should be blown at once.

The destruction of bridges, too frequently, has been left to untrained personnel, often with disastrous results. Army officers, therefore, must know the correct techniques for executing bridge demolitions

Protection

An aggressive enemy will attempt to seize important bridges intact, or to destroy them prematurely. These attempts may be made by raiding parties coming over land or by boat, by airborne troops, by guerrillas, fifth-columnists, or by air attack.

All bridges important enough to be classified as *deferred* must, therefore, be guarded by a security detachment armed with antitank weapons. These detachments are known as "close-bridge garrisons." Such garrisons normally will be designated by divisions for bridges within their boundaries. Antiaircraft protection of the bridges should be given a high priority within the division antiaircraft plan.

Firing of Demolition Charges

The firing of demolition charges clearly needs the most careful control. Failure to blow a bridge in time may have results fatal to our operation, while a premature demolition may prove just as disastrous. It is essential, therefore, that the decision to blow the bridge, passed from the responsible tactical commander to the engineer officer in charge of the firing party, must be clear and concise, and must be forwarded in channels where there is no danger of interference with the receipt of the information.

The responsible commander must decide for each demolition whether, in the event of enemy interference, it is more important that the bridge remain intact even though it may fall into enemy hands, or whether it should be destroyed at all costs, even though some of his troops may be cut off. This decision will be subject to modification as the withdrawal proceeds and the number of our troops on the far side decreases. The initial decision and all subsequent modifications must be passed immediately to the commander of the local close-bridge garrison.

Preliminary demolitions present few problems. Orders will be issued by the responsible commander through his engineer officer to the unit which will actually destroy the bridge. The engineer officer then exercises staff supervision over the execution of the demolition plan. The responsible engineer officer should report the completion of the program and the results to the commander.

The procedure for firing *deferred* or *final* demolitions must be as foolproof as possible. It is suggested that this procedure have three "links":

1. The commander empowered to authorize demolition.

2. The commander of the close-bridge garrison.

3. The engineer officer in charge of the firing party.

The commander empowered to authorize demolitions may be the corps or division commander, or the authority may be delegated to a regimental commander. In the case of a *final* demolition, the authority may well be the covering force commander. It is the duty of the responsible commander to decide exactly when each bridge should be destroyed, and to issue the necessary order to the commander of the appropriate close-bridge garrison. This may be done in person, or through a staff officer stationed at the bridge.

The commander of the close-bridge garrison is then responsible for giving the order to fire to the engineer officer in charge of the firing party.

The engineer officer in charge of the firing party is responsible only for the technical function of blowing the bridge. However, if the enemy has an air capability, the engineer officer must be instructed when to load the bridge with explosives and when to place the detonating caps in position, since a hit, or near miss, by a

bomb may detonate the charge prematurely. Such instructions are based upon recommendations from the division engineer.

Let us see how this method works. Suppose that the division artillery and the reserve regiment are to withdraw, after dark, over an important bridge for which the division has been assigned responsibility. During the afternoon, an engineer detail under Lieutenant "A" reports to the bridge site and prepares the bridge for demolition. A rifle company from the reserve regiment outposts the bridge area with the company commander, Captain "B," designated as commander of the close-bridge garrison. Also at the site will be Captain "C," a staff officer from division headquarters, who will maintain radio and, if possible, telephone communication with the division command post (CP).

The staff officer reports to the division CP as the various units clear the bridge. As soon as the last unit has cleared, the division commander makes the decision to destroy the bridge and so directs the staff officer. Captain "C" at once passes the order to Captain "B." Captain "B" then withdraws his company to the near bank and directs Lieutenant "A" to blow the bridge.

The bridge is blown and Lieutenant "A" reports the result to Captain "B." Captain "B" notifies Captain "C" (who, however, has probably been listening to the engineer's report) who forwards the report to the division CP.

All then proceed to new missions in accordance with previous instructions.

It should be noted that the staff officer does not leave the bridge site until demolition is complete or, if authority to demolish the bridge is delegated to a lower unit, until relieved by a staff officer from the lower unit.

Alternate Plans

Since even the best plans sometimes go awry, plans must be made for all contingencies. Three possible difficulties in the execution of the demolition program immediately come to mind. These are a failure of communications, the premature destruction of the bridges by enemy air attack, and the seizure of a vital bridge by an enemy attack of sufficient size to overcome the close-bridge garrison. Let us see how we can provide for these possibilities.

The responsibility for maintaining communications is charged to the unit signal officer. He follows the usual procedure by arranging for repair teams to maintain the telephone lines, alternate vehicular radios to replace damaged sets, and special messenger service. If communications cannot be maintained, and if the bridge is important enough, the commander may go to the bridge personally or, alternately, send his second in command or a senior staff officer with authority to make the necessary decision.

To provide against the contingency whereby the bridge may be destroyed by enemy air attack, at least two bridges over each obstacle should be earmarked for retention. In such cases, lateral routes must be kept open in order that units may be rerouted over the remaining bridge or bridges. If the enemy has the capability of destroying *all* of the bridges required for the withdrawal, the engineer officer then must be prepared to construct a new bridge.

The commander must provide for the third possibility, that of the seizure of a key bridge by an enemy force, by "thinking out" during the planning stage exactly what he will do, and then having the G3 prepare the necessary plans. One course of action is to reroute that part of the unit still to withdraw over a road still open. Otherwise, the decision must be made promptly as to whether to abandon the

isolated forces or to relieve them. If a considerable part of the unit withdrawing is still on the far bank, then an attack probably will be launched to recapture the bridge and open the route.

The commander and his staff must devise alternate plans for all other contingencies. Only by the maximum provision of such flexibility in both the planning and the execution of these plans can we hope to conduct retrograde movement successfully in the face of a superior and aggressive foe.

Historical Example

An interesting historical example occurred at Vielsalm, Belgium, on 23 December 1944, during the Battle of the Bulge. The 7th Armored Division, Combat Command "B" of the 9th Armored Division, part of the 106th Infantry Division, and the 112th Regimental Combat Team of the 28th Infantry Division were to be withdrawn west across the Salm River. There were only two useable bridges open, a highway and railroad bridge located side by side at Vielsalm. Early on the morning of 23 December, Company "K," 112th Infantry, was ordered into position as the close-bridge garrison. The bridges were prepared for demolition.

The Assistant Division Commander, 7th Armored Division, personally appeared at the bridge sites to check the clearance of the withdrawing units.

The 508th Infantry Regiment of the 82d Airborne Division, which was moving into a defensive position on the west bank of the Salm River at Vielsalm, had the following orders issued to it:

* * * * *

"Bridge(s) at Vielsalm will not be blown until 7th Armored Division and attached units have cleared and bridge(s) are threatened by the enemy. Staff officer, 7th Armored Division [Assistant Division Commander], will give decision on clearance of 7th Armored Division units.

"Commanding Officer, 508th Infantry, will give the order to blow the bridges. This authority not to be delegated below a battalion commander. A division engineer officer will be responsible for the execution of the order to blow the bridges."

* * * * *

After the 7th Armored Division had cleared the bridges, the Assistant Division Commander of the 7th Armored Division so notified the 508th Infantry. Company "K" was then released and rejoined its battalion. The Assistant Division Commander rejoined his division. An engineer detail from the airborne engineer battalion of the 82d Airborne Division remained at the bridge, and the 508th Infantry took over the mission of providing the close-bridge garrison.

About 2145, the enemy pushed up to the bridges and, at 2153, the order was given to the engineers to blow the bridges. The railroad bridge was demolished, but the charges on the highway bridge apparently were defective and did not go off. The enemy was then driven back from the bridge, the charges corrected, and, about midnight, the bridge was blown.

Illustrative Example

Let us see now how the division commander and his staff plan a demolition program. The 20th Infantry Division is holding a defensive position in the northern part of the area pictured on the sketch map (see Figure 1). At 0600 on 1 May, an order is received from corps directing that the division withdraw on the night of 2-3 May, to a position 6 miles to the south of the Minor River. The 106th Engineer Combat Battalion is attached to the division at once for the duration of the operation. All corps troops are to be withdrawn south of the Minor River during the night 1-2 May. The division is given the responsibility for destroying all the bridges in its zone during the withdrawal.

The division commander turns to his G3 and says, "My decision is to withdraw the 58th Infantry south along the general axis of Highway 50. The remainder of the division is to withdraw in the zone west of the railroad along the general axis of Highway 40. The 20th Reconnaissance Company maintains contact with the enemy. I want you to work up [among other tasks] a plan for blowing the bridges."

The G3 studies his map and decides, from a tactical viewpoint, that the bridges over Highways 40 and 50 should be classified as *deferred*, and that all others, classed as *preliminary*, can be blown at dark on the night of the withdrawal. Before finalizing his plan, he co-ordinates with the G2 to discuss the enemy's capabilities, with the G4 concerning rearward movement of service units and vehicles, with the division engineer for technical advice about the demolition program, and with the commanding officer of the division reconnaissance company who will be the rear guard commander.

In this case, the G2 states that the greatest enemy threat is from the northwest. The G4 reports that he plans to recommend that all service units be withdrawn south of the Minor River during the night 1-2 May. He also states that the railroad will not be used in his withdrawal plan. The division engineer recommends that as many bridges as possible be designated as *preliminary* and, especially, that bridge "A" be so classified since its destruction will present technical difficulties. The reconnaissance company commander requests that bridges "C," "D," "J," and "I" be left open for his final withdrawal.

With these considerations in mind, the G3 begins to prepare his plan. He accepts the division engineer's recommendation and puts bridge "A" in the *preliminary* class. This is desirable because of technical reasons, the enemy threat, and because there are three other bridges over the Main River that can be used. The railroad bridges "E" and "G" are not needed and they, too, are classed *preliminary*. Bridge "K" likewise is not needed by

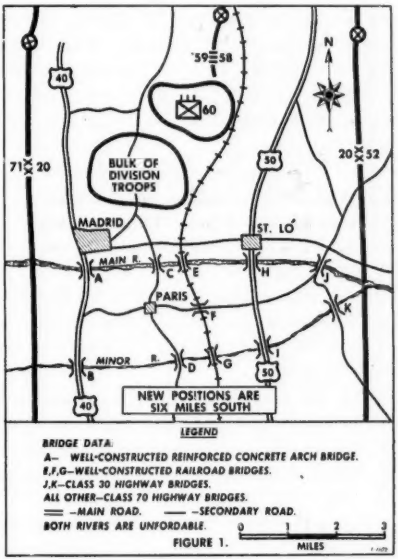


FIGURE 1.

any unit so it is added to the *preliminary* list.

The G3 next considers the bridges needed by the withdrawing troops. The 58th Infantry Regiment will require bridges "H" and "I" for their withdrawal. Since bridge "H" is needed only by the 58th Infantry, the responsibility for its destruction is delegated to the commanding officer of that regiment.

The remainder of the division, less the rear guard, will withdraw over bridges "C," "D," and "B." The G3 considers classifying bridge "B" as *preliminary* but rejects that idea both for the safety feature (insurance should bridge "D" be destroyed) and because it will enable him to

route units south from Paris over the most direct road to their new position. As many units will use these bridges, the responsibility for their destruction is retained by the division commander. All three bridges are classed as *deferred.*

Bridges "C," "D," "J," and "I" are needed by the rear guard (the reconnaissance company) to expedite their withdrawal. These bridges, therefore, are classified, initially, as *deferred* with the expectation that they will be the *final* bridges.

The overpass at "F" is classified as *deferred,* and authority to demolish it is retained by the division commander. This will add flexibility to the withdrawal plan by providing a lateral route between the two rivers, as this route will be required in the event that either bridge "I," or bridges "B" and "D" are destroyed by enemy air attack.

The G3 now must determine which of the close-bridge garrison commanders will be authorized to destroy the bridges to prevent their capture by the enemy. Since he plans on bridge "C" being a *final* bridge and open to the last, the premature destruction of bridge "J" should not seriously affect the withdrawal. The close-bridge garrison commander at that location is, therefore, authorized to demolish bridge "J" if necessary. For similar reasons, the G3 also delegates this authority to the commander at bridge "B." It is unlikely that the overpass at "F" will be threatened by the enemy. Nevertheless, if an enemy does penetrate that far, it will be highly desirable to deny him the use of this lateral route. The G3, therefore, in his plan includes the delegating of a similar responsibility to the close-bridge garrison commander at "F."

The G3 now completes his plan in the form of an annex to the division operation order for the withdrawal (see Figure 2).

The first paragraph of the annex classifies bridges "A," "E," "G," and "K" as *preliminary* demolitions. The Commanding Officer, 106th Engineer Combat Battalion, is directed to perform the necessary demolitions at 1830 (just after the end of evening nautical twilight) 2 May. He is further ordered to report the results to the division CP as soon as firing is completed.

Thus we see that the G3 plans to classify as *preliminary* and to destroy the unnecessary and technically difficult bridges as soon as security permits. It should be noted that the bridges are not to be blown before darkness sets in on 2 May, for if the enemy through his air reconnaissance discovers the demolitions, he will have been given one of the best indications that a withdrawal is planned.

The *deferred* demolitions are listed in the form of a table in paragraph 2 of the annex. Note, also, that the plan for firing the deferred *bridges* is worked out in careful detail, with the division commander retaining full control over their destruction by means of personal representatives, equipped with adequate communications, located at the critical sites.

This illustration indicates that, by means of careful planning and through the adoption of a simple command technique, we can ensure that a demolition program will be virtually foolproof. A commendable feature of this technique is that it can be used by any unit without additional personnel or special equipment. It ensures that the decisions of the commander pass to the firing party along a clearly defined channel. With the use of radio communications, the responsible commander is able to move freely within his zone and yet retain complete control of the entire program.

Summary

1. The demolition of a bridge is a tactical decision and should be ordered only by a designated tactical commander. Engineer firing parties are responsible

CLASSIFICATION

(Takes same classification as operation order)

20th Inf Div
PARIS, KANSAS
011700 May 50

Annex 6 (Bridge Demolitions) to OPNO 14
Maps: KANSAS, 1:50,000 PARIS-MADRID; and Sketch Map 1

1. *Preliminary Demolitions.*

Description	*Map Reference*	*Code Name*	*Time bridge will be demolished*	*Unit CO responsible for demolition*	*Remarks*
MAIN RIVER Highway Bridge over River at A	—	Lemon	021830 May	CO, 106th Engr C Bn	CO, 106th Engr C Bn will report results of demolitions to Div CG not later than 022000 May.
RR Bridge over River at E	—	Orange	021830 May	CO, 106th Engr C Bn	
MINOR RIVER RR Bridge over River at G	—	Grapefruit	021830 May	CO, 106th Engr C Bn	
Highway Bridge over River at K	—	Lime	021830 May	CO, 106th Engr C Bn	

2. *Deferred Demolitions.*

Description	*Map Reference*	*Code Name*	*If to be blown at discretion of CO close-bridge garrison, to prevent falling into enemy hands.*	*Unit responsible for*		*Minimum strength of close-bridge garrison*	*Officer authorized to order demolition*	*Remarks*
				Firing Party	*Local protection*			
MAIN RIVER Bridge over River at C	—	Tennis	No	20th Engr C Bn	CO 60th Inf	One rifle company	CG, 20th Inf Div	Asst G3, 20th Inf Div reports to site by 021700 May.
Bridge over River at H	—	Golf	No	20th Engr C Bn	CO 58th Inf	One rifle platoon	CO, 58th Inf	To be blown when detachments left in contact have cleared. Report to division when blown.
Bridge over River at J	—	Hockey	Yes	20th Engr C Bn	CO 58th Inf	One rifle platoon	CO, 20th Recon Co	To be blown when 20th Recon Co units have cleared. Report to division when blown.
RAILROAD Overpass at F	—	Football	Yes	20th Engr C Bn	CO 58th Inf	One rifle platoon	CG, 20th Inf Div	Division In off reports to site by 021700 May.
MINOR RIVER Bridge over River at B	—	Soccer	Yes	20th Engr C Bn	CO 60th Inf	One rifle platoon	CG, 20th Inf Div	Division In off reports to site by 021700 May.
Bridge over River at D	—	Baseball	No	20th Engr C Bn	CO 60th Inf	One rifle platoon	CG, 20th Inf Div	Asst G3, 20th Inf Div reports to sight by 021700 May.
Bridge over River at I	—	Boxing	No	20th Engr C Bn	CO 58th Inf	One rifle platoon	CG, 20th Inf Div	Division In off reports to site by 021700 May.

FOX
MAJ GEN

App: A—Sketch Map 1
Distr: A
OFL: /s/ Train
G3

FIGURE 2.

only for the technical preparation for the destruction of the bridge, and the actual firing.

2. In a planned withdrawal, a comprehensive demolition plan, to include the disposition of all the bridges, must be carefully prepared. Alternate plans should be provided.

3. All personnel assigned to the program must understand *what* they are to do, *when* they are to do it, from *whom* they receive their orders, and what their *authority* is in the event of any emergency.

4. Important bridges must have adequate local protection. The commander of the close-bridge garrison must have explicit orders as to the extent of his authority to order the demolition of a bridge, if its capture by the enemy is imminent.

In the training of the American soldier, great emphasis has been and will continue to be placed on preparing him, psychologically and physically, to endure the hardships of the most brutal kind of warfare and to meet and overcome a savage and ruthless enemy who violates every recognized rule of international law.

General Mark W. Clark

Our top military planners have developed and recommended sound, realistic, and workable plans for military action in support of our national aims. If thinking citizens will make clear to their representatives in government the kind of national policy they want, the Armed Forces—and the Army as a vital member of the team—will work out a safe and economical military policy to support it.

Lieutenant General M. S. Eddy

Manpower Conservation—Combat Units

Lieutenant Colonel David L. Edwards, *Infantry*
Instructor, Command and General Staff College

THIS article is designed to describe those means by which personnel services assist in reducing manpower losses in combat units and in stimulating the individual's desire to be a productive member of his unit.

The Personnel Services

The principal personnel services are the Army Postal Service, finance service, the chaplain's service, and special services. The cost in personnel to operate these services in a type field army is indicated below. (Figures shown are approximations and will vary slightly with the situation.)

Services	*Strength*
Army Postal Service	
Army Postal Units	625
Clerks [1]	520
Finance service	516
Special services	441
The chaplain's service (chaplains only)	350
Total Personnel	2,452[2]

[1] Does not include company (battery) mail clerks who have other primary duties.
[2] This is less than one percent of the field army strength (406,750).

Other services not included in the above tabulation are: rest and leave facilities, welfare services (Red Cross, and the like), and Public Information. They are not listed because the military personnel utilized by them is either barely significant or it may be replaced, for the most part, by indigenous civilians.

Mail service.—Prior to World War II, the Army made no effort to organize and operate a mail service either as part of the active Army or the civilian components. The present Army Postal Service was begun in 1940. Even though it was established only after it became apparent that mail could not be distributed through the same channel as rations, the ultimate efficiency of its operations was a great morale factor for troops overseas. Today, Army Postal Units (APUs) are part of both the active Army and the Organized Reserve.

During World War II, the Army Postal Service not only collected, transported, sorted, and delivered countless millions of letters, but also it collected and delivered Expeditionary Force Messages (fixed text, nominal cost) and Senders' Composition Messages, where facilities permitted.

There were numerous difficulties encountered. The greatest problems were found in moving and sorting the mail. The difficulty of moving the mail was chargeable to the failure or the inability, as the case might have been, to allocate transportation for the sole purpose of carrying mail. The sorting problem was

The Army has developed personnel services to an extent undreamed of a decade ago. Popular misconceptions relative to their purpose, manpower costs, and value must be corrected if they are to be used wisely

provoked by the rapid evacuation of casualties together with the forward movement of replacements.

The mail situation finally was brought under control even though neither problem was ever solved completely. The transportation situation improved as commanders and their staffs learned to appreciate the problem and the necessity of solving it. The sorting problem was alleviated by establishing five directories in the European Theater of Operations (ETO) for the purpose of sorting mail which had been outdistanced by addressees. The central directory, alone, employed 4,000 clerks at one time. This was a theater installation and the personnel utilized were civilians.

Separate directories were established for hospitalized personnel and for ground force reinforcements. The Army Postal Service soon learned that one way to reduce their problems was to remove the conditions which caused them. To this end, proper instructions were disseminated to individuals and units regarding such matters as postage, the use of the nearest Army Post Office (APO) for the dispatch of mail, and the currency acceptable for stamps and money orders.

There are only 2 officers and 44 enlisted men (assigned and attached) to handle the mail service in an infantry division. Company mail clerks are not included in these figures because they perform their postal activities in addition to other duties. Mail service does require manpower, but those engaged full time in postal functions, in a division, can be drawn from limited assignment personnel.

It must be understood that mail is a personal link between the soldier and his home and family. Furthermore, mail delivery is more than a privilege; it is an obligation assumed by the Department of the Army. The soldier, whose mail is delivered promptly, generally has a higher morale than might otherwise be the case and is motivated to become a better, more able fighting man. Troops everywhere look for mail constantly, and the slightest delay in its appearance is certain to meet with complaints from all ranks. It is apparent from the figures in the preceding table that, for the services rendered, the cost in manpower to operate a mail service in a field army is very low.

Finance service.—The finance service has a span of influence equaled only by the Army Postal Service. It affects not only the soldier himself, but also directly affects his dependents. Again like the Army Postal Service, the finance service was not entirely prepared at the start of World War II for the vast job it had to perform. The absence of separate disbursing units was a stumbling block. This condition was repaired in short order, however, and today separate disbursing units are not only part of the Organized Reserves but are found in the active Army as well.

When one considers that the personnel of the finance service, in a type field army, numbers approximately 516, it is inexpensive in view of the services rendered. These are the payment of troops; the provisions for the use of foreign currency; the handling of soldiers' deposits and personal transfer accounts; instigating and checking on the allotment system; and the furnishing of advice on financial matters to commanders.

Special services.—The special services section of a division consists of one officer (major) and six enlisted men. The special services officer is a member of the division special staff and operates directly under the supervision of the G1. Special services officers are not provided for, organically, in units below the division, but may be designated by commanders on an additional duty basis.

Special services helps to occupy the soldiers' free time with sports and whole-

some entertainment. The benefits are higher morale and a lower venereal disease rate. However, special services is not always able to provide soldiers with suitable entertainment. Once the troops become dependent on special services they may feel "forgotten," if the standards drop for any reason. The limitations inherent to special service activities in the combat zone should be explained to the troops. In addition, the special service officer must inform the troops of future plans.

This article holds no brief for special services as an agency of "mollycoddling." An incident occured in Korea wherein overzealous newspaper men incorrectly charged that the troops were provided with toothpaste but no ammunition. While the substitution of toothpaste for other tonnage is not within the purview of the special services, this example, if completely true, would indicate a misapplication of providing "service for the troops." Therefore, special services should always be subjected to review from the perspective of the practicality of its operations while the troops are in combat.

Chaplains.—The chaplain is charged with all matters pertaining to the religious and moral life of all members of the command. He is, primarily, a clergyman, but his functions and interests relate to all military activities so that the values of religion might become a part of the total life of the command. The services of a chaplain are indispensable for troops about to enter combat, or for troops in combat. Wherever he may be, his services are sought at all hours of the day and night. He ministers to the spiritual welfare of his unit much as the medical officer looks to its physical welfare. The need for religious expression is so great that, on occasions when a chaplain has not been available, laymen have endeavored to substitute for him in their own manner. The approximate number of

With the drone of airplane engines in the background, an Army chaplain conducts religious services in a bullet-riddled hangar in Korea.—Department of Defense photo.

chaplains allotted to the spiritual welfare of a type field army is 350.

Troop Information and Education.—Today, Troop Information and Education is regarded as a personnel service. There is doubt, in some circles, as to whether it will continue to be regarded as such. Therefore, it is not treated here beyond a brief statement on the value of military newspapers.

Military newspapers, when properly supervised, can be a tremendous force in support of morale. However, experience has shown that the opposite effect is possible. In the future, there will be no excuse, whatsoever, for any military newspaper which bases its destiny on sensational journalism rather than its subordination to the welfare of the military establishment.

Rest Areas

Conserving manpower through personnel services cannot be discussed adequately without mentioning rest areas and similar installations. The value of leave centers, recreational areas, rest camps, and rest areas was proved during World War II. When statistics show that the useful span of fighting days for the top 7 percent of our front-line soldiers was 210 days (Italian campaign), it is evident that our manpower was mismanaged. The number of fighting days could have been increased materially if opportunities had been provided for leave, rest, relaxation, and general rehabilitation.

Combat exhaustion was an important element in 20 to 30 percent of the desertion and absent without leave cases in combat units in the ETO. Most of these cases came from infantry units. When the tactical or strategic situation permitted the periodic withdrawal of units for rest and recreation, the problem of combat fatigue was not serious in such units. Combat exhaustion, like a contagious disease, affects everyone near the sufferer. More often than not, this pyramids the troubles already being borne by the sufferer. A hypothetical illustration would be: A soldier suffering from combat fatigue becomes involved in a breach of discipline; an inexperienced officer injects himself into the situation and an otherwise minor offense becomes a major offense.

Individual cases of combat exhaustion are eased at rest camps, leave centers, and by rotation. These antidotes are of assistance only to the individual. As the picture broadens, it is the unit that needs rehabilitation.

The rest area is one of the best means available for restoring a unit to full fighting efficiency. It permits the build-up of team training involving replacements. It provides an opportunity for the using unit to bolster discipline, rehabilitate equipment, and enhance the physical and mental conditioning of its troops. Meanwhile, the troops have the time and opportunity to enjoy the freedom provided by passes and leaves. The above concept differs from that under which the World War II rest areas operated. At that time, rest areas were operated, primarily, by special service units. True, the unit utilizing a rest area provided its own housekeeping personnel, but, as a rule, no other duties were prescribed.

To return to the present-day concept, the rest area is now used for the general rehabilitation of a unit. This means that training as well as recreational facilities are at hand. The operating personnel, at a permanent rest area, are still provided by the using unit, but additional personnel (civilian if possible) are made available so that the facilities might include dispensaries, post exchanges, a bakery, barber shops, a post office, baths and laundries, a clothing and equipment exchange service, ordnance maintenance, engineers (for the construction of training facilities), finance, signal (switch-

board), chaplain, special services, Red Cross, and Troop Information and Education. It "costs" approximately 25 officers and 500 enlisted men to operate a rest area (less messes) for an infantry division. That figure allows for no civilian employees to assist. Our aim is to replace military personnel with civilians whenever possible. That means that we must operate a rest area with a permanent overhead made up of cellular units filled with limited service personnel, assisted by civilians.

The use of rest areas must be devoted to the restoration of the combat efficiency of fatigued units by combining the "shakedown" training of replacements, with training lessons based on recently completed campaigns, together with a program of rest and recreation.

Conclusion

The appreciation and utilization of personnel services is a command responsibility. The officer with primary staff responsibility for these services is the G1. A full realization of the low costs and the great benefits that accrue to the commander who uses these services wisely is part of the military education of every officer. As a commander, or a staff officer, be certain that your unit is educated to, and respects the purpose of, personnel services.

NEXT MONTH

Main Articles

The eight main articles include "Command of the Tactical Air Force" by Colonel Francis C. Gideon; and "A Modern Infantry Division" by Lieutenant Colonel Donald T. Kellett.

Foreign Military Digests

The foreign digests include "Offensive and Defensive Action in Cities" from the *Revista Militare* (Italy); and "The Mounting of Raids" from the *Journal of the Royal United Service Institution* (Great Britain).

Books for the Military Reader

Reviews of *Chief of Staff: Prewar Plans and Preparations* by Mark S. Watson; and *The Front is Everywhere*, by Lieutenant Colonel William R. Kitner; plus other books of interest.

Relief in Place—Passage of Lines

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PLANS, orders, and reports pertaining to combat operations often contain terse, simple statements which fail to portray the complexity of the operation to which reference is being made. Examples of such simple statements are: "1st Inf Div: Pass through elements of 2d Inf Div in zone and attack in the direction. . . ." and "3rd Inf Div: When relieved by elements of 4th Armd Div, assemble as corps reserve in the vicinity of. . . ." These and similar items, while admittedly serving their primary purpose, depend on the general background and military training of the reader for complete interpretation. Adequate visualization of the operations referred to in the examples given, a passage of lines and a relief in place, requires a thorough knowledge and understanding of the tactical considerations, planning functions, co-ordination necessary, and command responsibilities involved. Furthermore, such knowledge and understanding is vital to the commander or staff officer concerned, whether he be in the headquarters directing the operation or in a participating unit.

Definitions

Relief in place.—A relief in place may take one of two forms:

1. A relief in place to continue the attack is an operatoin in which the forward units (as a minimum) of the relieved unit are replaced on an *area basis* by the relieving unit. The relieved units then are withdrawn from the area prior to the resumption of the offensive.

2. A relief in place to continue the defense is an operation in which all elements of a unit are relieved, normally *unit for unit* and *weapon for weapon*, and the relieved unit is withdrawn from the area.

The principal point of comparison between the relief in an offensive situation and a relief in a defensive situation is in the *purpose* of the operation. In a defensive situation, the entire purpose of the relief is to continue to present the *strongest possible defense*. In an offensive situation, the relief, primarily, is intended to place the relieving unit in a *suitable attack formation*, at the same time providing impetus to the attack by the employment of fresh troops.

Hereafter, in this discussion, only that form of a relief in place which involves a continuation of the attack will be considered.

Passage of lines.—A passage of lines is an operation executed only to assume the offensive or to continue the attack. A passage of lines differs from a relief in place to continue the attack in that it involves the actual passage of the incoming unit's assault echelons through those elements of the passed through unit which are in contact with the enemy. Elements of the passed through unit remain in position until they have been actually passed through and their in-

fantry fires have been masked, at which time they may be withdrawn from the area or assembled for future action.

Security Measures

A relief in place or a passage of lines places particular importance on the detailed planning for, and co-ordination of, security measures. Allowing the enemy to obtain information of our plans will not only alert him, as to our projected operation, but will permit him time to react, thereby enabling him to take advantage of the resulting congestion and confusion within our own forces. This problem is complicated further by the fact that the units concerned may have different standing operating procedures and different characteristics.

Some of the measures which must be co-ordinated in advance, in order to maintain security, include:

1. Maintaining normal patrol activity along the front of the unit to be relieved or passed through.
2. Requiring patrol and reconnaissance personnel of the relieving or passing unit to wear the shoulder patches or other distinctive insignia of the relieved or passed through unit.
3. Maintaining a normal pattern of artillery fires.
4. Restricting aerial observation and reconnaissance of the area to aircraft of the relieved or passed through unit.
5. Limiting the use of vehicles of the relieving or passing unit in forward areas, particularly during daylight.
6. Maintaining normal radio communications on the part of the relieved or passed through unit, and restricting its use by the relieving or passing unit.
7. Providing a common system of identification for all units involved.
8. Planning the schedule of reliefs, so that designated units are available to provide security while other units are being relieved.

Tactical Considerations

In offensive combat, it may be necessary to relieve units in contact with the enemy by executing a relief in place or a passage of lines. Either of these operations may be desirable:

1. To continue the momentum of the attack with fresh troops.
2. To change the direction of the attack.
3. To exploit a weakness in the enemy position with reserve forces.
4. To initiate an offensive on a front where stabilization has existed.

When the forward elements of a unit in contact are in defensive positions, their disposition usually is unsuitable for an attack. Both the relief in place and the passage of lines can be used to regroup units into desirable attack formations. These operations not only overcome the disadvantage of attacking from a defensive formation, but also avoid the undesirability of attacking with troops who have acquired a defensive frame of mind.

A relief in place and a passage of lines are operations used in warfare. Their successful execution is dependent on a knowledge of techniques, careful and detailed planning, co-operation, and co-ordination

A relief in place or a passage of lines frequently is designed to narrow the frontages of attacking units, for the relieved or passed through unit still may be required to continue its attack on a reduced front. A passage of lines, in this situation, may restrict the commander of the passed through unit in his continuation of the attack, and a relief in place

will often be more suitable from the viewpoint of the replaced unit. Plans for executing a relief in place, however, must be in harmony with the plans for continuing the attack.

When conditions permit, the most advantageous attack formation is best achieved by a passage of lines. However, undue congestion may result in forward areas when executing a passage of lines, if the enemy is capable of seriously retarding the initial progress of the assault elements.

While the illustrations in this discussion portray a relief in place or a passage of lines taking 2 nights, it must be borne in mind that improvements in transportation facilities make it possible for units to conduct these operations in 1 night. To do so reduces the chances of disclosure of the operation to the enemy.

Illustrative Example—Relief in Place

The example, presented in Figures 1 through 6, illustrates, schematically, a case in which a relief in place to continue the attack is conducted over a period of two successive nights. The priority of relieving subordinate units, plans for fire support, security measures, and the passage of command are among the points which should be particularly noted.

Figure 1 shows the 3d Infantry Division in a defensive situation. The 5th Infantry Division, well to the rear, has been ordered to relieve the 3d Division in place to continue the attack.

A number of the preliminary matters have already been accomplished. The 5th Division has established an advance command post at the location of the command post of the 3d Division. Conferences are in progress to cover such details as the time of relief of subordinate units; conducted reconnaissances; guides to be furnished incoming units; facilities, weapons, and supplies of the 3d Division to be taken over by the 5th Division; the time of passage of command; and the coordination of security measures.

All preliminary matters have been completed and the 5th Division is now in the process of completing the relief. Shortly after dark the first night, the 5th Division artillery moves into previously selected position areas (Figure 2). The following day, the 5th Division artillery will complete all details for taking over the fire support in the 3d Division sector. In unusual circumstances, such as when only limited position areas are available and the enemy is aggressive, it might be necessary to move up only one artillery piece per battalion, the first night, for purposes of registration and then move up the balance of the artillery the second night. Under normal circumstances, the artillery of the division that is being relieved remains in position until after its front-line infantry units have been relieved on the second night, thus ensuring the maximum artillery support during the critical hours of the relief.

In addition to moving in the 5th Division artillery, the reserve regiment of the 3d Division is relieved on the first night (Figure 2). As far as the hours of darkness and the terrain permit, additional subordinate units may be relieved or partially relieved, giving priority to those relieving units which could, most profitably, use the daylight hours the following day in carrying out detailed reconnaissance for the performance of their supporting roles.

Figure 3 shows that the reserve battalions of the two front-line regiments of the 3d Division have been relieved by the 5th Division. This relief also could take place during the first night, if time and space factors would permit its inclusion in the troop movement plan.

Figure 4 indicates the relief of all front-line infantry elements during the hours of darkness of the second night. Note that command has now passed to the

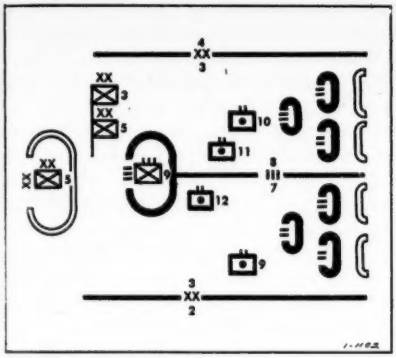


FIGURE 1.

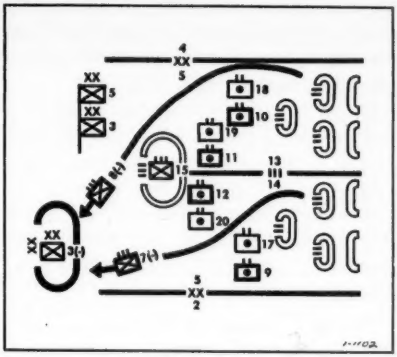


FIGURE 4.

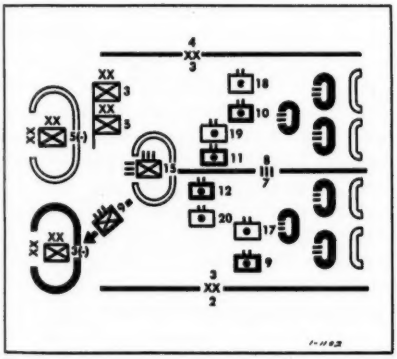


FIGURE 2.

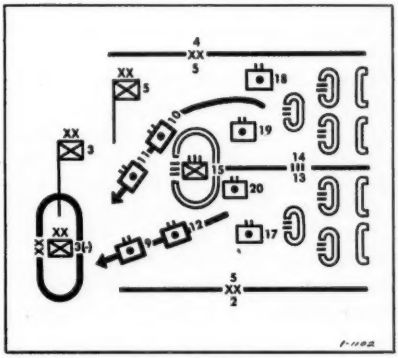


FIGURE 5.

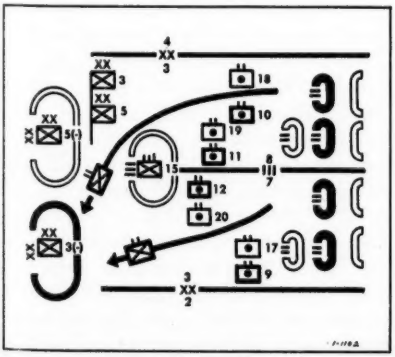


FIGURE 3.

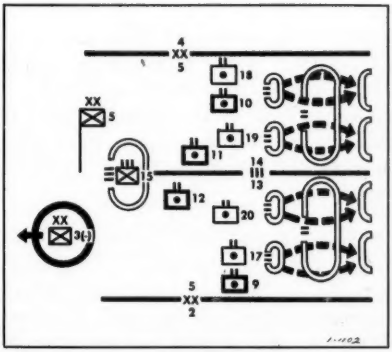


FIGURE 6.

Commanding General, 5th Infantry Division. This passage of command takes place at a time mutually agreed upon by the commanders concerned.

Figure 5 shows the artillery of the 3d Division moving back after the completion of the relief by the 5th Division. However, the artillery of the relieved division often is left in position to support the attack where additional fire power is required and the outgoing artillery is not required elsewhere.

Figure 6 shows an example in which the plan of relief of the front-line infantry battalions has been varied. The two front-line battalions of each of the front-line regiments of the 3d Division have been relieved by those battalions of the assault regiments of the 5th Division which have been earmarked as regimental reserve. Thus is depicted a relief in place on the division level in such a fashion as to permit two assault battalions to *pass through* one front-line battalion in each regimental zone. The assault battalions of the 5th Division then can be in correct attack formations when they attack through the reserve battalions.

This formation tends to give more impetus to the attack, but must be balanced against the disadvantages of stringing out one battalion on such a wide front as to make its assembly and rapid use in the continuation of the attack more difficult. It also denies the assault battalions an opportunity to become familiar with the terrain, and requires closer co-ordination between the assault battalions and those in contact.

Illustrative Example—Passage of Lines

The example, presented in Figures 7 through 10, illustrates, schematically, a passage of lines made under ideal conditions, in which there is ample warning and at least 1 night to complete the necessary troop dispositions prior to the attack. As in a relief in place, there are certain preliminary measures which must be accomplished, but frequently time will prohibit lengthy detailed preparations. In some cases, the attacking unit must move up and pass through to the attack within a few hours, conducting an abbreviated reconnaissance while moving through the area of the division in place. In any event, plans for fire support and the passage of command are among the points with which the commanders involved should be especially concerned.

As before, the 3d Division is in a defensive position. However, in this situation the 5th Division has been ordered to execute a passage of lines through the 3d Division to resume the attack. As in a relief in place, note that the incoming division has established an advance command post in order to initiate early preliminary measures (Figure 7).

Figure 8 shows that the 5th Division has moved up to a forward assembly area in the vicinity of the 3d Division's rear boundary. The Commanding General, 5th Infantry Division, may desire to take command, at this time, of the zone in which he will attack or he may wait until the bulk of his assault units are in the zone, prior to these units reaching their assault positions. It is desirable for the commander of the passing unit to take command of the zone early in the operation. Note that this is a marked difference from a relief in place. This is necessary since the principal considerations involved are those concerned with the preparations of the incoming division for the forthcoming attack. The commander of the attacking division must be able to control the movement of units over routes through the zone, control the communications system, and supervise the preparations for fire support as well as many allied matters.

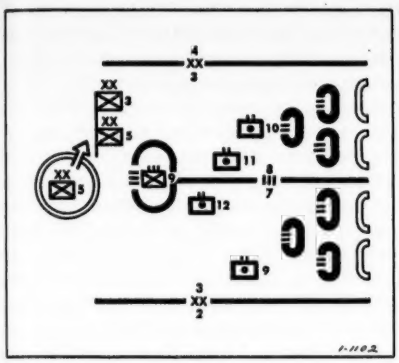


FIGURE 7.

The 5th Division has now established its command post with the command post of the 3d Division, although it may be moved ahead to a location from which the Commanding General, 5th Infantry Division, can better exercise command over his attacking units. A small advance command post may satisfy these requirements.

Figure 9 shows the completion of troop dispositions during the hours of darkness prior to the passage of lines. The 5th Division artillery has moved into position areas along side of the 3d Division artillery. The assault battalions of the 5th Division have moved into assembly positions from which they can launch their attack through the front-line battalions of the 3d Division. The reserve battalion of each front-line regiment of the 3d Division has been relieved. The reserve regiment of the 3d Division also has been relieved.

Time and space factors may not permit the relief and movement of all units indicated above during the hours of darkness preceding the passage of lines. If not, the reserve regiment may be moved forward later.

In Figure 10, the assault battalions of the 5th Division have jumped-off in the attack. The front-line battalions of the 3d Division have remained in position

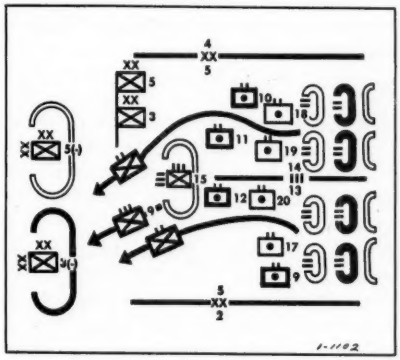


FIGURE 9.

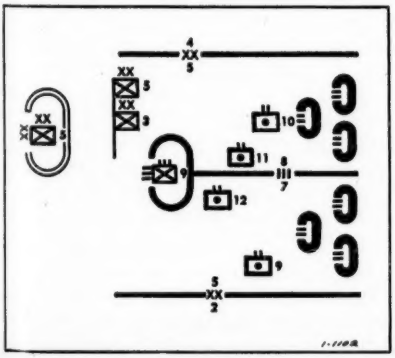


FIGURE 8.

and support the attacking echelons by gapping mine fields, by guiding assault units, and by fire from their organic weapons until this fire is masked. The 3d Division artillery also has remained in position to reinforce the fires of the 5th Division artillery during the initial stages of the attack, or until such time as has been previously agreed upon by the commanders concerned. The reserve battalions of the assaulting regiments are moved forward to support the attack at such a time that an objectionable or dan-

gerous concentration of troops will not occur in the forward areas.

Logistical Planning

Logistical planning for either a relief in place to continue the attack or a passage of lines follows, essentially, the same general pattern and procedures that are used in planning for an infantry division in the attack. Early reconnaissance and contacts with the unit to be relieved or passed through by the G4 and each of the technical service staff officers, are essential to the proper planning for either of these operations. Each of these officers must have early information of the proposed relief or passage to include the tentative tactical plan to be supported. Detailed reconnaissance must be made in the new area. Opposite numbers on the staff of the unit to be relieved or passed through must be contacted for an exchange of information, co-ordination, and agreement on use of existing supplies or facilities. Of particular importance in a relief in place are agreements covering the exchange of equipment between units. Installed field wire and emplaced weapons, for example, may be left in place by the relieved unit which picks up like equipment, on an item for item basis, from the relieving unit in its rear area. These decisions must be reached quickly, for the means of service support and transfer of service responsibilities during the relief or passage must be known. Plans for the movement of service troops must be consummated.

Certain additional logistical problems present themselves in the conduct of a relief in place to continue the attack. The incoming division will have prepared plans for the location of its installations and for the use of the roads in the area. The outgoing or relieved division also will have prepared plans for the closing out of its installations and the use of the roads in the area. There must be co-ordination and compromise between the two plans. This is necessary because of the movement of both tactical and administrative troops of both divisions within the area at the same time, and because of the necessity of preserving security so that the enemy will not discover the relief and build-up for the attack. By the same token, detailed planning of both divisions must be integrated so that the incoming division may take over all the appropriate supplies, installations, facilities, or construction projects of the relieved division. This transfer will hardly ever be 100 percent complete but it will take place whenever possible. Lastly, the early publication of a new administrative order, prior to the movement of the relieving division into the area, will assist in the orientation of the units and the continuation of logistical support upon completion of the move.

Each technical service staff officer must prepare plans and recommendations concerning those matters pertaining to his service which are to be included in the division administrative order. He must work out the details for the transfer of existing supplies or facilities with the corresponding staff officer of the relieved division. He must co-ordinate the location and assignment of missions to technical service units presently supporting the relieved division but remaining in the area to support his division. The decision must be made as to whether additional technical service units or detachments will be needed. Concurrently, advance planning for the logistical support of the division in the later phases of the operations must be initiated.

The use of transportation and movement schedules for a relief must be carefully planned and co-ordinated within each division and between the two divisions. Inasmuch as the relief is a tactical move, G3 will retain primary in-

terest for the over-all co-ordination and supervision. All members of the general staff are interested in the details. G1 is concerned with the movement of the division rear echelon based upon approved plans and schedules. G2 disseminates information concerning the enemy which may affect the movement, and recommends security measures in connection with the move. G3 indicates the location and employment of tactical units, the over-all plans for priority and sequence of movements, the implementation of security measures, and prepares the movement orders. G4 is concerned with the location and movement of division service elements and supplies.

Careful co-ordination between the two divisions must be obtained as regards the selection of routes and the timing of movement schedules to prevent conflict between incoming and outgoing movements. Any conflict should be resolved in favor of the relieving division. The relieved division must furnish competent guides. Transfer of traffic control responsibilities and the manning of traffic control posts must be agreed upon. The relieved division should control these activities during the first part of the relief, and the relieving division during the last part. Thus, in a relief conducted over a period of 2 nights, the relieved division would be in control the first night and part of the next day. It would, probably, turn over traffic control responsibilities and the manning of the traffic control posts prior to darkness on the second day. With two divisions on the move, there will be many vehicles in the area. The problem is to keep movement to the minimum for security reasons and still move the units and supplies. For example, there may be a necessity for considerable ammunition build-up and restrictions on daylight supply movements at the same time that troops must be moved forward. The use of one or more truck companies from corps or army to haul supplies forward may be advisable. These same trucks then may be used to help move out the relieved division.

A passage of lines also presents certain, additional problems. Consideration must be taken of the passed through division's installations and its contemplated use of the roads within the area. A study of the problems of the passed through division must be made to determine what effect, if any, they will have on the movement of the incoming division through the area. It could call merely for a restriction as to roads and their use, or it might call for detailed planning and the solving of problems similar to a relief in place to continue the attack.

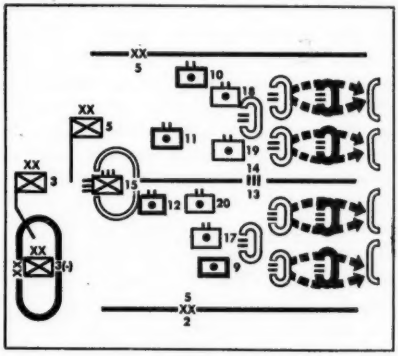


FIGURE 10.

Supply economy is an integral part of military discipline and is essential to the effective conduct of combat operations. It must be given special emphasis when executing either a relief in place or a passage of lines due to the difficulties imposed by exchanges of supplies and equipment, evacuating excesses, and temptations offered troops to abandon supplies and equipment.

Conclusion

Both the relief in place to continue

the attack and the passage of lines permit the continuation of the attack with fresh troops. Each has certain inherent characteristics, and each has certain advantages and disadvantages.

A relief in place to continue the attack:

1. Enables the relieving unit to make a more detailed reconnaissance of the area than does a passage of lines.

2. Enables the unit being relieved to be used elsewhere faster than in a passage of lines.

3. Is a more hazardous operation, during the critical period, than a passage of lines due to the fact that neither unit is fully disposed to meet an enemy attack.

4. Is normally executed at night.

5. Permits front-line units to be relieved on an area basis and be clear of the area before the attack jumps off.

6. Permits command of the area to pass to the commander of the relieving unit only when he can assume responsibility for the area. This is, normally, late in the relief.

A passage of lines:

1. Permits the adoption of a more favorable attack formation than does a relief in place.

2. Can be executed more quickly than a relief in place, for it can take place during the day or night.

3. Provides the attacking unit with support by fire from the passed through unit which remains in place until its fires are masked. This, in turn, may result in undue congestion of the battlefield.

4. Permits command of the area to pass to the commander of the attacking unit early in the operation due to the fact that emphasis is placed on preparations for the attack.

When the situation permits, the passage of lines is the preferred type of operation. The relief in place *must* be executed, however, when the unit being relieved is required elsewhere immediately, or when a passage of lines would produce undue congestion of the battlefield.

Both operations are dependent for success on careful and detailed planning, cooperation, and co-ordination by all concerned. This is achieved by close liaison, early reconnaissance, and person-to-person contact on the part of commanders and staff officers of all units involved.

It required the experiences of World War II to demonstrate that the most important basic factor in a nation's military strength is its war production potential and ability to convert smoothly and quickly its industry, manpower, and other economic resources.

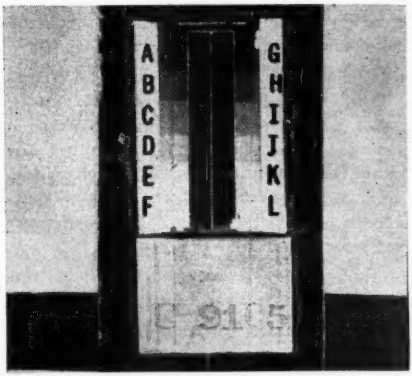
Major General A. C. McAuliffe

MILITARY NOTES AROUND THE WORLD

UNITED STATES

Atomic 'Dog Tag'

A simple, inexpensive device to measure a person's exposure to atomic radiation has been developed for military and civil defense needs.



The Army's new dosimeter, left, consists of a metal case and a flat package of sensitized film which measures very slight to fatal doses of radioactivity. Right, by comparing the shade of the center strip with the graduated scale on the sides, a person can determine the amount of radiation he has received.—Department of Defense photos.

Suitable for mass production, the device is small and light and can be hung from the neck. It will measure very slight to fatal doses of radioactivity.

Called a dosimeter, it consists of a metal case containing a flat paper package of photographically sensitized film and a pod of developing solution. Exposure to the harmful gama rays causes the center of the film to turn light. Comparison of the grade of whiteness with a graduated scale on the edges of the strip indicates the degree of radiation to which the wearer was exposed.—News release.

Defense 'Guerrillas'

Skiers in the Pacific Northwest have started a movement to organize the 5,000 skiers in the region as a potential mountain guerrilla force in case of invasion by an enemy.

The plan, if approved, calls for training the skiers to guard mountain passes, hydroelectric projects, domestic water supplies, power lines, and communication systems, as well as to carry on guerrilla warfare.—News release.

Air-Flow Study

Balsa wood dust is being used to make the movements of air visible in investigations concerning air-flow.

Its first use was in studying helicopters. The trend toward increasing the size and load capacity of helicopters has resulted in an increased use of multiple-rotors. In order to study the air patterns resulting from such rotors, this balsa-dust technique was developed.

This method has provided a simple means of observing the flow distribution through model rotors and is suited for many other applications in which a pictorial representation of the air-flow pattern in a given plane is desired.—*Science News Letter.*

Engine Governor

The Navy is putting the finishing touches on a new governor for generator engines which will be able to respond with superhuman speed. If an engine's load skyrockets instantly from zero to 100 percent, the governor will have its speed back where it belongs within one-half a second. Ordinary load speed will be kept within one-fourth of one percent of absolute constancy.

While most engine governors depend upon mechanical means of operation, the new governor is actuated by slight variations in current.—*All Hands.*

B-47 Production

The Air Force has ordered priority production on the *B-47* bomber. This six-engine bomber can travel faster than 600 miles an hour, has a 10-ton bomb load capacity, and can operate above 40,000

The Air Force's *B-47 Stratojet* bomber.

feet. It has a wing span of 116 feet, a length of 108 feet, and a height of 28 feet. The *B-47* carries a 3-man crew, while the *B-29* requires an 11-man crew and the *B-36* a 16-man crew.—News release.

Magnetic Fluid Brakes

The thumb, not the foot, may operate the automobile brakes of the future. The magnetic fluid principle developed for automobile clutches has been put to work in a braking device operated by the flow of an electric current.

In the new braking device, a very light oil saturated with iron dust of a smooth grain type is used. It forms a liquid ribbon only 1/25-inch thick between the brake rotor and the outside drum in which a magnetic coil is embedded. Current to activate the coil is controlled by a push button on the steering wheel. The brake takes hold smoothly and its power increases as the magnetizing current is stepped up.—*Science News Letter.*

New Tank Destroyer

The Army's new 105-mm recoilless rifle is credited with being able to knock out any known foreign tank. It does not replace any other weapon, but was designed to provide the infantry with greater "hitting power." The weapon has a range of about 5 miles and can fire ten rounds per minute. The over-all length of the rifle is 130 inches. Complete with sights and mount, it weighs approximately 750 pounds.—Department of Defense photo.

Shipbuilding Program

Plans to construct 48 minesweepers and 113 amphibious vehicles (LVTs) were announced recently by the Navy. At the same time, the Department of Defense announced that competitive bids have been invited for the construction of 203 lighters and barges for the Army and the Navy.—*Army Navy Air Force Journal.*

Industrial Mobilization

The Air Force will expand its industrial mobilization program during the fiscal year 1951 to $79,800,000. This is an increase of $65,300,000 over the last fiscal year.

The Air Force said approximately 74 percent of this increase is due to added procurement of machine tools and production equipment for reserve stocks, which would be required as a partial production base in event of general mobilization.—*Army Navy Air Force Journal.*

Morphine Substitute

The Army Medical Corps has expressed complete confidence in the efficacy of a postwar substitute for morphine, the chief battlefield painkiller for the wounded. The synthetic drug, derived from cheap and common chemicals, has been used in Korea, and was found to be the equivalent of morphine.

Development of the substitute has been pushed by the Army for the last 5 years with co-operation from the National Research Council and the National Institute of Health.—*The New York Times.*

Light Tank

The Army will begin production of a new *T41* light tank this year, which is reported to be "superior to anything we know of in a comparable class."

The new *T41* weighs 25 tons, mounts a 76-mm gun, and travels at least 35 miles an hour.—News release.

Turboliner

America's first transport plane with turboprop engines recently completed its inaugural flight. The twin-engine plane, designated the *Turboliner*, is a modified version of the 40-passenger *Convair* transport. After preliminary tests, the plane will be used for a flight research program.—News release.

Increase Helicopter Range

A method for towing helicopters by conventional aircraft to and from the scene of a rescue pick-up has been developed by the Air Force. By using *C-54s*, *C-82s*, and *C-47s* as tow planes, the range of the helicopter is extended to 1,500 miles or more.

The helicopter can be towed off the runway by the plane, or it can hover in the air and pick up the towline of the tow plane. Once the towline is engaged, the helicopter stops its engine and is pulled along by the tow plane.

When over the rescue spot, the helicopter starts its engines and releases the tow. Descending under its own power, it picks up the rescued persons, climbs up again, and picks up the towline.

This method will provide rescue facilities in areas where no landing areas for fixed-wing planes exist or which were previously out of helicopter range.—*American Helicopter.*

New B-36 Tested

A new model of the *B-36*, more powerful than the jet-equipped *B-36Ds* now in production, is undergoing flight tests.

Designated the *B-36F*, the big bomber is equipped with six of the world's most powerful piston engines—developing 3,800 horsepower each—in addition to the four jet engines hung under the wings in twin pods.

Present piston engines being installed on *B-36Ds* are rated at 3,500 horsepower. —News release.

Crash-Rescue Boat

The Air Force has accepted delivery of a prototype of an improved crash-rescue boat designed especially for picking up airmen downed at sea. The boat has a tailgate which can be lowered into the

The Air Force's new crash-rescue boat.

water to provide a platform for bringing aboard survivors. The Air Force found, during World War II, that the hauling of injured airmen over the sides of earlier-type rescue boats sometimes complicated their injuries.—*New York Herald Tribune.*

Underwater Explosions Photographed

What happens when explosive weapons detonate deep in the ocean is now being studied with the use of a special motion picture camera which takes 20,000 pictures a second.

The camera is able to record the oscillations of explosion bubbles. These are gas globes which are formed by the hot, expanded gaseous products of the explosions.

These studies should provide new information on the behavior, effectiveness, and design requirements of various types of underwater explosive weapons.—*Science New Letter.*

GREAT BRITAIN

Runway Construction

US Army personnel are overhauling runways at three Royal Air Force bases for use by United States heavy bombers. By the end of summer, the runways will be approximately doubled in length and widened by one-fourth.

This project is being undertaken through a joint agreement with the British Air Ministry which furnishes specifications and materials.—*The New York Times.*

Night-Fighter Expansion

Great Britain plans to increase the size of her night-fighter force and equip it with the latest types of jet night-fighter aircraft.—*The Aeroplane,* Great Britain.

Defense Budget

Britain's defense budget for the current fiscal year—including emergency increases brought on by the Korean War—is the highest in her peacetime history. Over the next 3 years, the Government will step up defense spending by 50 percent.

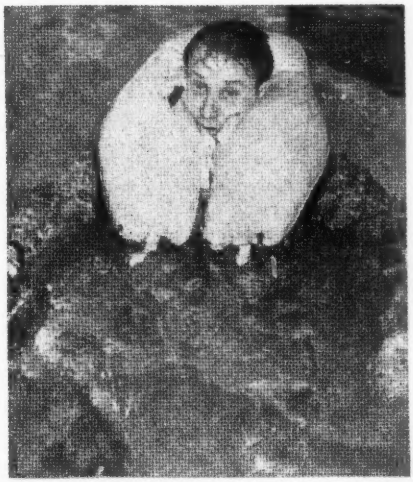
In 1938-39, on the eve of World War II, defense spending totaled 28 percent of the budget and 5 percent of the Country's income. Last spring, before Korea, defense spending totaled 20 percent of the budget and 7 percent of the Country's income. In the next 3 years, defense spending is likely to total 24 percent of the budget and between 8 and 10 percent of the national income.—*The New York Times.*

Occupation Survey

Great Britain has completed a survey of all personnel in the Territorial Army who are in reserved occupations. Only Territorials in occupations not on the reserved list would be immediately called up in the event of an emergency.—*The Services and Territorial Magazine,* Great Britain.

New Life Jacket

The Royal Air Force has developed a new life jacket for use by airmen downed at sea. In principle it is similar to the "Mae West," having a kapok lining and carbon dioxide inflation, but with an additional safety feature. With the "Mae West" it was possible for an unconscious airman to lie face down in the water, but the new jacket has overcome this hazard. —*The Aeroplane,* Great Britain.



New life jacket developed by the RAF.

Air Raid Shelter Survey

The Government has asked local authorities for a survey of existing air raid shelters and estimates for additional shelters.

By the end of June, the Home Office will ask for another survey involving the preparation of specific plans. Two types of shelters are planned—one for protection against high explosive bombs, and another for protection against atomic bombs. —*The New York Times.*

DENMARK

Jet Fighters

The Danish Air Force will have 160 first-line jet fighter planes, flown by American-trained Danish pilots, by the end of 1952.—News release.

Civil Defense

Danish civil defense authorities have started to reinstall air raid sirens in Copenhagen and other cities.—*The Christian Science Monitor.*

CHILE

Stock-piling

Conditions resulting from the Korean War have moved Chile to safeguard her industries from a lack of raw materials. As a first step, 10 million dollars has been allocated to establish a stock pile, with the idea of maintaining distributing centers throughout Chile.—*The New York Times.*

Foreign Military Briefs

The President of Brazil has asked for an appropriation of 1,800,000,000 cruzeriros ($90,000,000) to build hydroelectric plants, railways, and highways in northeastern Brazil.

The Hungarian Government has ordered the rationing of gasoline and oil. Persons not authorized ration cards have been ordered to sell their vehicles to the State at a fixed price.

Work started recently on a new international airport for Rome. The first of six runways is expected to be completed in about a year.

Switzerland can mobilize a military force of 850,000 men and women in the event of a war, according to *Militaer Orientering*, a Norwegian military magazine.

A 7,500-mile telephone line has been completed, linking Peiping and Moscow.

BRAZIL

Point Four Aid

The United States has allocated $800,000 for Point Four projects in Brazil to develop that country's transportation, power, and agricultural facilities.—News release.

Iron Study

A 10-year minerals investigation program in Brazil, the first step toward establishing a large-scale export of vitally needed iron ore, has been approved for continuance as a Point Four project.

While Brazil's iron resources have long been known to be among the largest in the world, precise data about distribution and grade have been lacking. Results of the current project will provide vitally needed minerals for defense and other purposes.—News release.

SPAIN

Reserve Officers

Spain plans to increase the number of reserve officers and noncommissioned officers in the Army. Part of this will be accomplished by increasing the number of university students permitted to take military training at summer camps, and by recalling retired officers still within the age limits for the reserve.—*The Christian Science Monitor.*

SIAM

Aerial Survey

The Government of Siam has awarded a contract for the aerial photographing and mapping of 5,790 square miles in central Siam. In addition, another large-scale survey, for the location and laying down of a new railway through Korat, has been ordered. This work is part of a large surveying program to further the development of forestry, mining, and agriculture in the Country.—*The Aeroplane*, Great Britain.

AUSTRALIA

Railroad Equipment

More than 150 modern locomotives are now on order in Australia and overseas for the New South Wales Railway Department. Twenty Diesel-electric type engines are being built in the United States and 50 locomotives are being built in Great Britain.—*Australian Weekly Review.*

Foreign Migrants

Some 142,000 displaced persons have arrived in Australia under the Government's scheme for bringing European DPs into the Country. Of these, about 9,000 have completed the 2-year work contract with the Government under which, in return for transportation to Australia and the chance for a new start in life, they agreed to carry out whatever work was found for them. They are now free to choose the kind of employment they prefer. Many have elected to remain in their present jobs, but others, with professional and business backgrounds, have found work more in keeping with their training.—*Australian Weekly Review.*

RAAF Training Program

Australia's Minister for Air recently outlined the program for training National Service men with the Royal Australian Air Force (MILITARY REVIEW, December 1950, p. 71). The RAAF will take 3,000 trainees during the first year and increase the annual quota to 5,000 by the middle of 1954.

On being called up for service, trainees will undergo 3-weeks' intensive recruit training. Selected volunteers will then go to air centers for flight training.

Ground staff trainees will be given 3- to 6-weeks' classroom training in various trades, and then complete 6-months "on-the-job" training.—*The Aeroplane,* Great Britain.

CANADA

Refresher Training

The RCAF has launched a refresher training program for ex-RCAF pilots designed to maintain a pool of trained personnel for use in an emergency as staff pilots and flying instructors. The program will provide training for 600 men each year.—*The Aeroplane,* Great Britain.

Steel Ban

The Canadian Government has banned the use of new steel in nonessential construction and given formal priority ratings to defense contractors.—News release.

Aircraft Warning System

The RCAF has turned Canada's northland into an extensive lookout post for potential enemy aircraft.

The move was started about 7 months ago as part of the security drive stemming from the Korean war.

Royal Canadian Mounted Police, meteorologists, and others serving in Arctic outposts have been requested to report to the RCAF any aircraft spotted in the area.—News release.

New RCAF Training School

A new flight training school for the Royal Canadian Air Force has been opened at Gimli, Manitoba. The new school gives the RCAF two basic training schools for providing instruction for Canadian, British, and other North Atlantic aircrews. Since the end of the War, only the flight training school at Centralia, Ontario, has been in operation.—*The Aeroplane,* Great Britain.

COLOMBIA

Stock-piling

Industries in Colombia have earmarked 25 million dollars in foreign exchange for stock-piling critical raw materials.—*The New York Times.*

FRANCE

Overseas Territories

France's relations with her overseas territories, interrupted during the War, are being re-established on the new concept of a French Union or Commonwealth of Nations rather than a colonial empire.

France started with a plan for industrializing and developing her territories, and, in the past 4 years, has spent 200 billion francs on the project. In 1950, 6 billion francs of Marshall Plan counterpart funds was spent in French Morocco on economic development, and 12 billion francs in Algeria for dams, power plants, and irrigation works.—*The New York Times.*

ITALY

Jet Aircraft Production

Italy has announced that she is producing jet airplane engines and *Vampire* and *Venom* jet fighters. Since Italy's peace treaty limits sharply the number of planes she may have in her military forces, it appears that at least part of the plane production will be available to the Atlantic Pact defense force.—News release.

Western Defense Force

The Italian Cabinet has announced that Italy would place three divisions at the disposal of the Supreme Commander of the North Atlantic forces. The announcement stated, however, that the three divisions represented merely an "initial" contribution to the integrated European army and that the number would be increased soon.—*The New York Times.*

IRAQ

Trade Pact

Iraq and Lebanon have completed a trade agreement which provides for reciprocal free port zones, customs exemptions, and currency exchange facilities.—News release.

NORWAY

Radar Station

The world's most northerly land-based radar station is being built by the Norwegian Polar Institute at Svalbard.—*The Christian Science Monitor.*

Military Service

Norway's Defense Minister has announced that conscripts who have undergone training will be recalled for additional courses in defensive doctrine pertaining to the Army, Navy, and Air Force. In addition, personnel now awaiting discharge after completing their service period will be retained in the armed forces. However, he stressed that this was not mobilization and was in line with the existing training policy.—News release.

EAST AFRICA

Radio-Telephone Link

Remote and little-developed areas of East Africa soon will be linked by the world's most modern radio-telephone system.

Using very high frequency multichannel radio-telephone equipment, the East African Posts and Telegraphs Department plans to establish, within the next 2 years, trunk connections to most points of Kenya, Uganda, and Tanganyika.

This system will put East Africa ahead of most of the world in the use of VHF multichannel links.—*The Christian Science Monitor.*

SOUTH AFRICA

Mobilization Plans

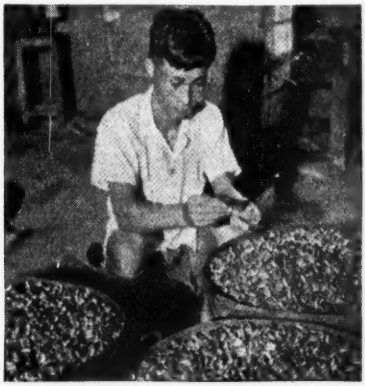
The Government of the Union of South Africa has announced that it is working on a plan for mobilizing its manpower in the event of another war. The Government had previously announced that it had started planning for switching industries to war production in the event of an emergency.—News release.

NATIONALIST CHINA

Army Training

The Chinese Nationalist Army is engaged in a large-scale training program to increase the efficiency of its estimated 600,000 troops.

Classes of 8,000 men attend schools of 6- to 8-weeks' duration which give them training in the use of all weapons, with special emphasis on markmanship and the handling of mortars and light field guns.



Military efficiency is the primary goal of a new training program being conducted by the Chinese Nationalist Army. Above left, a soldier performing the manual of arms. Above right, and infantryman in his trench during a maneuver. Below left and right, workers inspecting automatic weapons and ammunition being produced for the Army.

Individual initiative is stressed, and tactical exercises are conducted with small groups in order to emphasize this part of the training.—*The Sphere*, Great Britain.

INDIA

United States Aid

The Indian Government has concluded an agreement with the United States for technical assistance under the Point Four program.

The assistance will be in the fields of agriculture, communications, education, health, and the planning of multipurpose projects.—News release.

Army Reduction

Prime Minister Jawaharlal Nehru announced recently that he planned to reduce the size of the Army and slash defense appropriations.

"We want a highly efficient and highly mobile Army," Mr. Nehru said, "but that does not depend on numbers."—*The New York Times.*

HUNGARY

Russian Language

The transformation of the Hungarian Army along Soviet lines, which has proceeded with giant strides in the last 2 years, is to be completed by the introduction of Russian as an alternative language in which military commands are to be given and understood.

This will mean that every Hungarian officer must be able to give, and every Hungarian soldier to understand, commands in Russian as well as Magyar.—*The New York Times.*

COMMUNIST CHINA

Military Training

Communist China has instituted a basic military training program for men in the 17 to 25 age group and organized five new military training schools which are designed to "modernize" that country's armed forces. The new schools include an air academy, a naval academy, an artillery school, a tank school, and an antiaircraft school.—*The New York Times.*

USSR

Canal Construction

Russia is building a new 63-mile canal which will link five seas and three rivers and provide irrigation for 1,800,000 acres of semiarid land.

This construction project, which was interrupted by the German occupation, will link the White, Baltic, Caspian, Azov, and Black Seas and Russia's three main rivers —the Dnieper, the Don, and the Volga.—*The Christian Science Monitor.*

Naval Construction

The Russian Navy now has 350 to 370 submarines and is building 120 more, according to the new edition of *Jane's Fighting Ships.* The British naval yearbook reported also that the USSR has, or soon will have, 14 heavy cruisers of the 9,500-ton Kirov type, plus two former German cruisers of the 15,200-ton class.

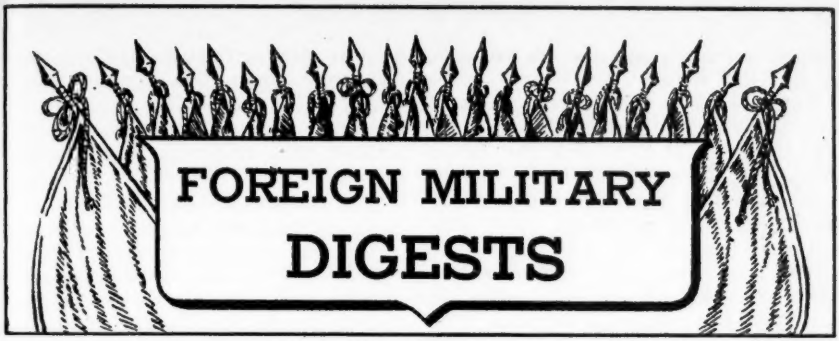
Jane's states that there have been reports that Russia has launched two 35,000- to 37,000-ton battleships equipped with firing towers for guided missiles, and is constructing a third.

The new book stated also that, "The capacity of Soviet shipbuilding, now largely under the supervision of German specialists and bolstered by foreign labor, is reported to be twice that of 10 years ago," and that Russia's naval expansion is "already far in excess of the normal requirements of defense."

The Russian Navy estimates for 1950-51 were about $3,850,000,000 as compared with $4,168,000,000 appropriated for the United States Navy for the same period.—News release.

Metals Control

Russia's metals industry has been reorganized to place iron and steel production under the direct control of one of that Nation's deputy premiers.—*The New York Times.*



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The Air Aspect of a Future War

Digested by the MILITARY REVIEW from an article by J. M. Spaight in the "Journal of the Royal United Service Institution" (Great Britain) May 1950.

TO ATTEMPT to forecast the nature or pattern of future wars is to ask for trouble. There have been many attempts to do so, but none has been very successful.

More than 20 years ago, Giulio Douhet wrote a paper on "The War of 19—" in which he foresaw a war where air power would decide the issue within a few weeks without other supporting arms. Later events, however, have proved him to be, in most respects, a false prophet.

It required more than 5½ years to end World War II, and air power was, by no means, the sole arm engaged in it. Nevertheless, Douhet was right when he forecast devastating raids upon cities as a main feature of future wars. Such destruction came to pass. However, the results were not as swift as he had forecast.

Still earlier—more than 40 years ago—H. G. Wells in his book, *The War in the Air* (1908), tried to imagine a world war in which air power would be dominant. He forecast a war in which lighter-than-air craft would sweep over enemy cities leaving a trail of destruction and confusion. Some of his descriptions might have fit air raids against Hamburg, Dresden, Tokyo, Hiroshima, or Nagasaki during World War II. And it is entirely possible that even greater destruction will occur in future wars. Science has given mankind the means of accomplishing, more swiftly and effectively, the devil's work which the prophets of doom foresaw. It rests with this generation to determine whether the catastrophes which are possible come to pass.

The A-bomb, the H-bomb, and perhaps the Z-bomb by the time a war comes, each more terrible than the last, open up a vista of horrors from which the mind recoils. The world is making ready, one would think, to plunge back into the dark ages. What is apparently in prospect now is a return to the savage days of Genghis Khan, 700 years ago. The nations are preparing to do, in a more scientific way, what he and his Mongols did with the crude weapons then available at Bokhara, at Samarkand, at Merv, and at Herat. They burned those cities to the ground and slaughtered the inhabitants. At Herat alone, more than 1½ million persons were massacred. Two centuries later, his great-great-grandson, Tamerlane, emulated but could not surpass his record in mass slaughter. Genghis Khan

still holds pride of place as the destroyer of his fellow men.

But he will hold it no longer if the new and projected instruments of mass destruction are used in the next war. Great cities will be wiped out, hundreds of thousands of the inhabitants will be killed, some swiftly, some slowly and with agonizing tortures, poisoned by the deadly rays of the atom bombs. The attackers will make a solitude and call it war. It will be mass slaughter more pitiable than that of the Somme, Passchendaele, and Verdun. There, at least armed men were slain in battle. The victims will now be old men and women, the sick, children, and infants. All will be engulfed in a wave of destruction from which there will be no escape.

Atomic Warfare

Detailed forecasts, fortified by diagrams, have been made in popular journals of the destruction which one atom bomb would cause in London. If one were dropped in Westminster, practically the whole West End and East Central districts of London would be leveled. If a hydrogen bomb were dropped there, the area of complete devastation would be eight times as great. The death roll would run into millions. It would be the end of London and all its inhabitants.

Conversely, there have been attempts to compute what Western aircraft could do in the way of urban cremation. Carrying atom bombs, they could not only reach Moscow and Leningrad from bases in Western Europe, but also the industrial towns on the Don and Dnieper Rivers, as well as such cities in the Urals as Sverdlovsk, Chelyabinsk, and Magnitogorsk. All Central Russia and the Ural and Baku regions could be reached from the North African coast between Tripoli and Suez. The new Siberian centers—Novosibrsk, Stalinsk, Krasnoyarsk, and Kemerovo—and, again, the Baku and Ural regions would be within the radius of action of bombers starting from the Arab kingdoms and protectorates. Vladivostok and the towns on the Amur River would be "atomized" from Japan or Okinawa.

Cities, cities, cities: note how it is taken for granted that they will be the objectives of the atomic raids. Picture it: each city a charnel house, an abattoir of human cattle; and airmen—for it is they who will deliver the bomb—as war's champion slaughtermen. What a role for a *corps d'elite*! Perhaps it will come to pass; and yet one wonders. Is it so certain after all? May there not be better targets to attack? Would a fight to the finish with A-bombs, H-bombs, and Z-bombs, an entire alphabet of them, launched by each belligerent on his enemy's cities, really be the best way to win a war or to prevent the enemy from winning it? There are some grounds for thinking that the prophets may not be right after all.

The problem will be one of stopping a great armed land mass before it sweeps like an avalanche over Western Europe. Will its advance be halted because cities are destroyed far away in the rear? The atom bombs could be used, conceivably, against the invading armies, but that would mean dropping them on Russian-occupied, not Russian-owned, territory; and objections based on political expediency probably would arise to that. Besides, to use the bombs tactically would also involve dangers for the defending forces. There seems to be no escape from the conclusion that the stopping of Soviet armies will be mainly and primarily a task for the Western Allies' ground forces.

The core of that defense will have to be, can only be, the reconstituted French Army. The French artillery, one of the oldest and most famous in the world, will be seen in action again. The other states of the Western Alliance will make their powerful contributions, too. Will the line hold? We can only wait and see. And what then? Well—"Gentlemen, when the barrage lifts. . . ." Here, at any rate,

for what it is worth, is the writer's idea of what will come next and his conception of the part which strategic air power will play in the second stage of the great clash of East and West.

Strategic Bombing

It will represent a leaf taken from the book which records the strategic bombing in World War II. People forget sometimes that there are more leaves than one in that book. That which deals with the "scorched-city strategy" of which atom bombing was only an extreme form was not the only or even the most important one. Another describes a different and, militarily, more profitable kind of operation, known as "interdiction." The *interdiction des arrières*, to use the expression of Camille Rougeron, was, as he shows, one of the essentials of strategic bombing in World War II. It was employed with brilliant success in France and Germany. General Dwight D. Eisenhower, describing in his dispatch on the operations in Europe in 1944-45 the effect which interdiction had upon the Germans' resistance in Normandy, said:

> By D-day, the Strategic Air Forces, together with the Tactical Air Forces, had so successfully performed their mission of disrupting enemy communications that there was a chronic shortage of locomotives and cars, repair facilities were inadequate, coal reserves reduced to 6 days' supply, and 74 bridges and tunnels leading to the battle area were impassable. The communication chaos thus produced had a fatal effect upon the enemy's attempts at reinforcement of the threatened areas after our landing.

Some of the results of this interdiction were described in a "Joint Statement on Strategic Bombing," compiled by the Air Ministry and the United States Strategic Air Forces in Europe and issued on 30 April 1945. This said:

> The German counterinvasion plan was to bring their reserve divisions to the battlefield at the rate of 48 trains a day; this was cut by bombing to 6 trains a day. It is known also that some armored divisions arrived at the battlefield without their armor, and that other troops arrived on bicycles or on foot, in no condition to begin fighting at once.

The air campaign against communications in Germany had equally important results. It began in August 1944, and reached its climax toward the end of February 1945, when in Operation *Clarion* some 8,000 to 9,000 aircraft, British and American, succeeded in bringing about the paralysis of Germany's entire railroad system. General H. H. Arnold stated in his *Third Report* in November 1945:

> Operation *Clarion* was a "milk run." All over Germany bombs exploded on signal-control points, marshalling yards, main lines, level crossings, embankments, bridges, viaducts, roundhouses, overpasses, and small junctions. Fighters and fighter-bombers attacked rolling stock. The German rail repair organization was swamped. Immediately . . . war production was cut in half and . . . traffic was reduced 90 percent. Operation *Clarion* marked the end of large-scale mobility for the German Army.

There, surely, is a pointer to the right strategic bombing policy for the next war. The Russian line of communications will be vulnerable in the extreme. It will be far longer, as well as having fewer alternative routes, than the German supply lines in 1944-45, or than the Allies' communications on land would be in a new war. A concentrated assault upon it, by masses of aircraft, should be even more damaging for the Russians than the interdiction was for the Germans. Colonel E. H. Wyndham has suggested that the "implanting" of atom bombs along the communications of a dictator invading the West would bring his supply service to a standstill, by producing "a series of radioactive shambles behind his fighting forces." The communications would run, however, largely through non-Russian territory, and, as already stated, it probably would be considered impolitic to drop atom bombs there. In any case, high explosive bombs, which would be more plentiful than atom bombs, would suffice for the purpose. Ordinary bombs, too, could do all that is needed to oil targets. The photographs

of the terrible destruction at the Concordia Vega refinery at Ploesti and the Rhenania Ossag refinery at Harburg, found in General H. H. Arnold's *Second Report* and *Third Report* leave no doubt about that.

Soviet armies, massed for invasion, with more than one deep river in their rear, would be in a most dangerous situation if the bridges behind them were dealt with as were those on the Seine and the Loire in 1944. Their life line of supply would be severed. They might well be the victims of the greatest military disaster in history. In any case, further advance would be out of the question. The "atomization" of distant Russian cities would be, in comparison, a gamble that might or might not come off.

But, it will be asked, may not the Russians on their side decide to launch atomic attacks on London and Paris? The writer submits that they are unlikely to do so. They will know that the Americans hold the trump cards in that grim game. America's stock pile of bombs will be larger and her resources for renewing it greater. The men of the Kremlin are no fools. They will do all they can to avoid atomic war. If the Allies do not start it, they will not. One who is well acquainted with the Russians' political philosophy has written: "Both for military and political reasons, the USSR is much less likely to initiate an atomic attack upon European and American cities than the United States is likely to use them against Russian cities."

Nevertheless, the old maxim that "one sword keeps another in its scabbard" still holds good, and the West would do well to maintain its stock pile for possible retaliation. To do otherwise might tempt the East to use the bomb.

Will the Americans, in fact, make such attacks? Some of the reasons for thinking that they will not are given or implied above. Another is the more important, perhaps, for it is an imponderable. It is the very genuine and widespread repugnance felt in the United States for this mode of warfare. It expressed itself, after the bombing of Hiroshima and Nagasaki, in August 1945. It made itself felt again when, on 31 January 1950, it was announced that the United States had decided to proceed with the development of the hydrogen bomb.

It is a feeling which extends to the fighting services in America. The views of some of the chiefs of the United States Navy were expressed, with nautical bluntness, during the Congressional investigation into the question of the *B-36* bomber and kindred matters toward the close of 1949. In the United States Army, too, there are many who look with distaste on such a manner of making war. General Eisenhower, telling his reaction to Secretary of War Henry L. Stimson's disclosure of the coming test of the atom bomb in New Mexico, said: "I expressed the hope that we would never have to use such a thing against any enemy because I disliked seeing the United States take a lead in introducing into war something as horrible and destructive as the new weapon was described to be."

The ethical objection to atomic warfare will be reinforced by another less lofty but very natural consideration—the fear that the nation which starts it will suffer in the end more than the enemy. There are some Americans who deprecate an atomic war with Russia for this reason. They point out that the United States is the more vulnerable, being a nation of "urban concentration and high technology," while the Soviet Union is not. Neither belligerent, in a future war, will be able to foretell what the other's *riposte* will be. Each will hesitate to launch a weapon which may be found to be a boomerang and, in the final reckoning, as damaging to the one side as to the other. It was that fear which kept unused the immense stocks of poison gas which each of the belligerents had ready in World War II.

Most of the military forecasts prior to World War II predicted that poison gas would be used in future conflicts. The few who expressed doubt were dismissed as not being "realists." This writer believes that present predictions that atomic weapons will monopolize future warfare may also prove to be erroneous. He believes that a future war will be, so far as the strategic air offensive is concerned, a war of interdiction with high explosive bombs and not an atomic war. This will be so even if the bomb is banned by international agreement prior to a future war.

Logistics Down Through the Centuries

Translated and digested by the MIILTARY REVIEW from an article by Lieutenant Colonel Senna Campos in "A Defesa Nacional" (Brazil) October 1950.

THIS article is not intended as a long dissertation concerning logistics and its present concept. It will attempt to describe briefly:

1. The place that logistics has occupied down through the centuries.
2. The application of logistics by various military chiefs for the benefit of the campaigns which they have undertaken.
3. The importance of logistics in modern warfare.
4. The position of logistics alongside strategy and tactics.

Concepts of Logistics

The era of improvisation and systematic exploitation of local resources is now a thing of the past. Success in battle cannot be won unless it is supported, in time and space, by an efficient organization and sufficient resources to achieve the objective in view.

A definition which will enable the reader to better understand the full scope of logistics should include all factors in that activity. The following is one of these definitions:

"Logistics is that part of the entire military activity which deals with production, procurement, storage, transportation, distribution, maintenance, and evacuation of personnel, supplies, and equipment; with induction, classification, assignment, welfare, and separation of personnel; and with facilities required for the support of the military establishment including construction and operation thereof. It comprises both planning and implementation."

Logistical superiority is a decisive factor of victory. An illustration of this point is provided by the Russo-German campaign. The German Army, although highly trained and confident of victory, became impotent and ineffective as soon as it was unable to maintain the logistical supremacy of the initial campaign.

The loss of the Philippines by the United States; the disaster at Singapore despite the efforts of Great Britain; the retreat of Japan in the Pacific in the face of increasing Allied power; the loss of North Africa by the Germans and Italians; and the crumbling of the "Atlantic Wall" in Europe are nothing more than the result of the lack of logistical balance between the opposing forces.

Historical Review

Logistical support at one time did not reach beyond the army rear area. The forces depended on what they carried with them, and also on whatever they could steal from local resources.

In 362 B.C., Epaminondas, the Theban general and statesman, set aside the custom of violent and arbitrary seizure of local resources and, for the first time,

made use of a system of requisition in enemy territory.

In the seventeenth century, King Gustavus Adolphus of Sweden reorganized his forces, and created supply trains which were protected by armed escorts. In addition, he established a regular system of billeting, took measures for providing food and uniforms, and separated the arms and services and set the ratio between them.

In the eighteenth century, Frederick the Great originated the staff system which, in its general lines, has continued to exist down to the present time.

Napoleon went further and created supply trains to take care of the needs of the troops, and organized engineer dumps and administrative transportation. On assuming command of the French troops on his first mission into Italy, he found them badly clothed, badly fed, irregularly paid, and almost without ammunition. His supply lines (Marseille—Nice) were threatened by the English Fleet and the Piedmont forces. In order to prepare his army for future battle, he had to exploit their morale to overcome their logistical inferiority. He urged his troops to capture quickly the fertile plains of the Pó, saying: "There you will find cities and rich provinces, honor, glory, and fortune." Within a short time, the army descended the mountains to obtain, by force, the logistical support which did not come from the rear, but which was indispensable for the continuation of its operations.

Despite the fact that Napoleon had established supply installations for the Russian campaign of 1812, he misjudged the duration of the campaign and found his army bogged down and ineffective in the face of an efficient enemy and the winter weather.

The various South American countries, in their campaigns, attempted the modest use of logistics, by establishing supply systems and depots. Although these efforts were small, when compared with later logistical systems, they were adequate for the scale of the battles at that time.

The Logistical Era

World War I marked the beginning of the "Logistical Era." The large number of troops employed, the great distances involved, and the quantities and different types of matériel which were required constituted an evolution in logistical activities. These factors gave rise to specialization and the need for the creation of various services to organize production and keep the required matériel flowing to the combat forces.

World War II began with a definite understanding of the value of all-out national effort and the necessity for logistical support of armies engaged in combat.

The various technical services—Ordnance, Medical, Quartermaster, Signal, and Transportation—had their development, as well as G4 sections which were required to handle the voluminous logistical actions in the staffs of the various echelons. But this did not prevent great nations, drawn into the fighting of World War II, from being surprised by the lack of organization of their military forces, by political dissension in domestic and international questions, and by a lack of organization of their sources of production, with respect to economic and industrial mobilization.

World War II provided problems of a magnitude undreamed of in the fields of strategy and tactics and, particularly, in the domain of logistics.

The high degree of mobility of the armies; the devastating employment of aircraft; the efficiency and unlimited quantities of weapons and ammunition; the surprising developments in signal communications; and the indescribable production potential combined to make World War II the most extraordinary event in history.

The present world situation had its origin in the last conflict. The two con-

tenders are antagonistic to one another because of differences in their philosophical, political, and economic concepts. The lessons of history point infallibly to the fact that sooner or later their dispute will be settled by force of arms, and the rest of the world, which has not yet recovered from the hardships through which it has already passed, will be drawn into the maelstrom.

While the politicians are preparing opinions and setting the world stage for the great and terrifying spectacle, the economic resources of the two antagonists are being mobilized.

In this gigantic matériel preparation, we perceive two distinct patterns. One involves the production of the most modern arms and equipment, and the mobilization of resources for a greater effort in the industrial and scientific fields. This one has qualitative superiority and possesses proved possibilities as regards industrial capacity. The other is preparing the greatest war machine of all times, making use of its existing industry and the resources of its satellite countries. It is the holder of quantitative superiority in the matter of men and matériel.

We hardly need to call attention to the logistical tasks confronting the two contending parties in equipping their forces and preparing their countries to support the effort of a possible armed conflict. The outbreak of this struggle, after the long and fatiguing period of the "cold war," will mark the end of the logistical preparation.

Summary

Summarizing, we may say that:

1. In past wars, and even at the beginning of the Napoleonic Era, logistical preparation did not extend to the equipping of forces for the initial outbreak of hostilities. One lived in the present; and future plans were based on the possibilities of securing resources from enemy lands.

2. Lack of transportation and poor roads reduced the amount of equipment that armies of the past could carry with them.

3. Logistical support in the early days was almost impossible due to the vast distances at which the forces operated.

4. Long supply lines, when they did exist, were influenced by the distance involved, the conditions of the roads, and the weather.

5. Armies of the past did not have the assistance of organized production to support their efforts in the field.

6. The present concept of logistics resulted from the scientific and technical progress in the matériel fields; the distances involved in the various fighting fronts; and the common instinct of self-defense and survival.

7. Doctrines evolve slowly, while strategy and tactics vary in accordance with logistical accomplishments, which are dependent on the achievements of science.

8. Clausewitz visualized the art of war as comprising two parts—strategy and tactics. Today, we must add a third—logistics.

9. For each strategical or tactical plan, there must be a corresponding logistical plan in order to ensure its success.

10. Victory is possible only to the one who possesses logistical superiority—qualitative as well as quantitative superiority.

6-2448

The Invasion of Italy

Digested by the MILITARY REVIEW from an article by Major O. D. Jackson in the "Australian Army Journal" May 1950.

THE original plan for the invasion of Italy had envisaged an assault by the British Eighth Army, with the XIII Corps (British) from Sicily attacking across the Straits of Messina (Operation *Baytown*) and the X Corps (British) from Tripoli landing in the Gulf of Gioia (Operation *Buttress*). Late in July 1943, while the Eighth Army was preparing to break through the German line in northeast Sicily, a third attack came under consideration at General Harold R. L. G. Alexander's headquarters in Algiers. This attack (Operation *Avalanche*) entailed a landing by the X Corps in the Bay of Salerno, south of Naples. (See Sketch Map 1.)

The immediate tasks facing the Supreme Allied Command were to establish a beachhead on the Italian mainland and to open the Straits of Messina to the Allied naval forces. On the other hand, it was apparent that southern Italy was suited admirably to enemy delaying action and the prospect of advancing up the peninsula, from the "toe" to Rome and beyond, was not an attractive one. Thus, in spite of the many obvious difficulties, it seemed that a seaborne hook such as *Avalanche* would be an effective means of avoiding a slow and costly frontal advance.

Whatever the solution, it was apparent that the Allied resources of landing craft and ships would not permit the mounting of three separate assault landings.

On 17 August, the day after Messina fell, General Bernard L. Montgomery was advised of the decision: *Buttress* to be abandoned, the Eighth Army to mount *Baytown*, and the new United States Fifth Army to mount *Avalanche*.

Developing The Plan

The objective of Operation *Baytown* was to establish a beachhead on the "toe" of Italy to permit the Allied naval forces to operate through the Straits of Messina. If the Axis forces withdrew, the army task was to follow up, in as great strength as possible, to draw the Axis forces away from the American Salerno sector.

Intelligence information disclosed the presence of one panzer grenadier division holding the Straits with one panzer division behind it. Both divisions appeared below full strength. There were also Italian troops in the area, but it was unlikely that they would offer any greater resistance than their comrades had done in Sicily. As it seemed probable that the assault would be opposed by German troops, General Montgomery was anxious to land in sufficient strength to make certain of carrying out his task quickly and successfully.

As the X Corps had been placed under the command of General Mark W. Clark's Fifth Army for *Avalanche*, the Eighth Army forces were limited to the XIII and the XXX Corps, both of which were committed in Sicily. [The XXX Corps was comprised of British and Canadian units.] In the original army plan, the XIII Corps was to launch the assault across the Straits of Messina. The XXX Corps was then to take over the beachhead, releasing the XIII Corps to carry on the advance.

Once again, there were many difficulties in planning the operation. While the target date for *Baytown* was 31 August, the Sicilian fighting did not end until 17 August. This situation had been overcome partially by the withdrawal of formations into reserve during the last 10 days of the fighting, but it was not until 17 August that it was certain which divisions would be available.

Again, the availability of landing craft presented a major problem. *Avalanche* had been given priority of resources as it was a larger operation and entailed a much longer sea voyage. The ships and craft allotted to the Eighth Army were sufficient only to lift an assault force of a few battalions and permit a very slow build-up. This meant that the use of both the XIII and the XXX Corps in *Baytown* was out of the question.

To achieve his objective, General Montgomery considered that it was necessary to assault with two divisions abreast and at least secure the Catanzaro "neck."

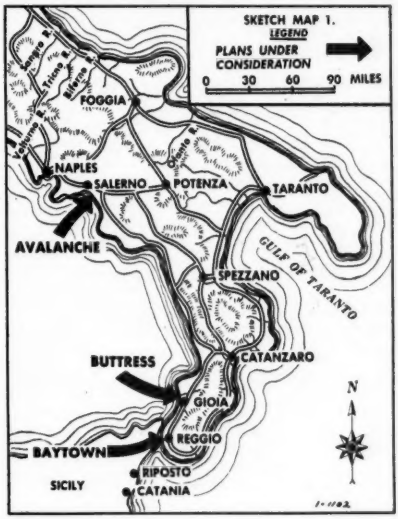
On 23 August, General Alexander explained his modified plan at a conference in Algiers and the necessary additional resources were made available. By this time it was impossible to launch the operation as scheduled and the target date was advanced to the night of 2-3 September. *Avalanche* then was to be mounted 6 days later.

These changes and delays caused considerable difficulties in detailed planning.

Would the Axis Forces Fight?

Three weeks before the end of the Sicilian operations, news was received of the fall of Mussolini and, at the Algiers conference, General Montgomery was given details of the negotiations which had been carried on secretly with the Italian Government. It was planned that, on 6 September, the Allies and the Italian Government would broadcast the acceptance of the Allied terms of unconditional surrender and that all Italian resistance would cease. It was hoped that this would force the Germans to withdraw from Italy, but there were already at least 15 German divisions in Italy. It was impossible to predict what the outcome would be.

Several small parties were sent across the Straits of Messina in an attempt to find out what the attitude of the Italian forces really was, but nearly all of these groups failed to return and no positive information was gained. Therefore, the decision was made that no risks would be



taken. Operation *Baytown* would be mounted as a fully fledged assault.

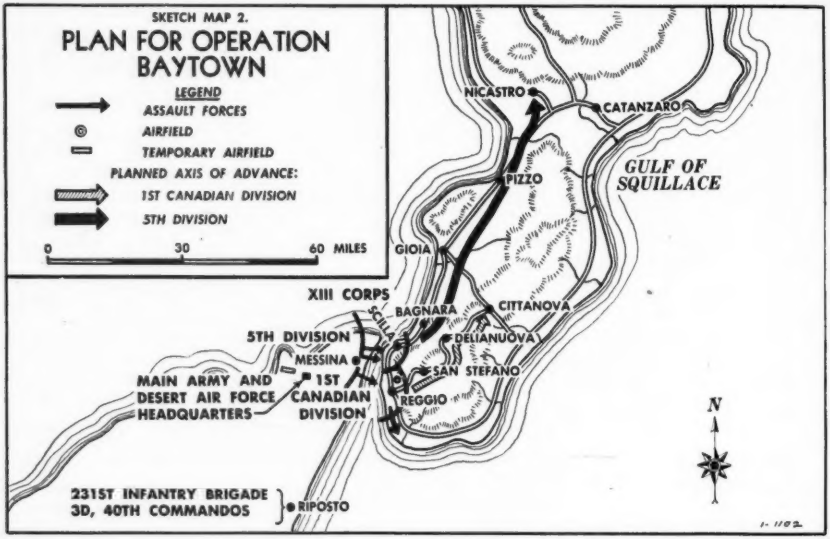
The Eighth Army Plan

As illustrated on Sketch Map 2, the XIII Corps was to assault with the 1st Canadian Division on the right and the 5th Division on the left. The landings were to be made between Reggio and Scilla with the Catanzaro "neck" as the first objective. The 1st Canadian Army Tank Brigade was to support the assault infantry, while the 231st Infantry Brigade plus the 3d and the 40th Commandos were to be held in readiness at Riposto, in Sicily, to mount subsequent seaborne hooks if they proved necessary.

To obtain maximum effectiveness from the extensive naval, air, and artillery support, the operation was timed so that the assault waves would arrive off the beaches at first light on 3 September. The artillery support was to be provided from Sicily by the XXX Corps artillery; the

XIII Corps artillery, not already embarked; plus the 6th Army Group Royal Artillery, strengthened by 48 American heavy guns; in all some 600 guns.

Once ashore, the main XIII Corps thrust was to be launched by the 5th Division on Nicastro, along the north coast road axis, while the 1st Canadian Division was to be directed on Cittanova via Delianuova. As insufficient bridging was available to develop operations along the south coast road from Reggio, this flank was to be blocked by a force operating south of Reggio.



The Assault

At midnight on 2-3 September, the assault troops began loading into the landing craft from the northeastern Sicilian beaches. The sea was calm and moonlight sufficient to reveal the outlines of the armada.

At 0230, 3 September, when the craft were midway between the island and the mainland, the massed artillery of the Eighth Army opened fire. At 0300, the leading troops of the XIII Corps touched down on the assault beaches. (See Sketch Map 3.) Great quantities of smoke raised by air action and naval and artillery supporting fire obscured the landmarks on the Italian shore and there was some confusion in finding the right beaches.

Scarcely a round was fired by the Axis forces to interfere with the landing arrangements. The Italian coast defense troops were only too anxious to surrender, while it was quickly apparent that the German forces had withdrawn.

By the end of the day, Reggio and its airfield had been taken, the 1st Canadian Division had reached San Stefano, and the 5th Division was in Scilla. The beaches and roads had not been mined and no German troops had been encountered.

To speed up the advances, a commando unit was landed on the north coast near Bagnara during the night of 3-4 Septem-

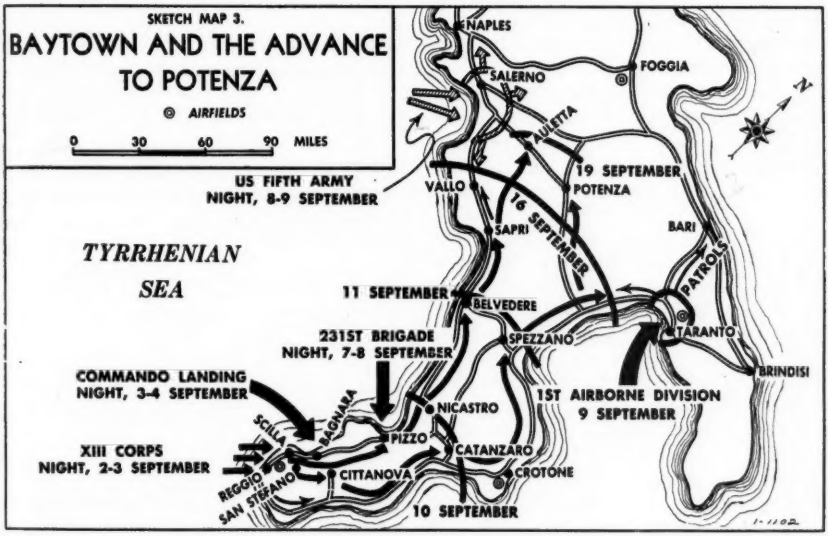
ber. This force succeeded in getting in behind a small German rear guard.

The Advance to Catanzaro

Throughout the remainder of the advance up the "toe," the XIII Corps was delayed considerably by large-scale German demolitions on both road and railway axes. All these lines of communication abounded in bridges, viaducts, culverts, and tunnels, and offered enormous scope to the skillful German engineers.

In the face of these difficulties, progress was slow. At Cittanova, on 6 September, the 1st Canadian Division axis of advance was switched to the south coast road, where better progress was made toward Catanzaro. Meanwhile, the 5th Division was being delayed by German rear guards north of Bagnara, and so the 231st Infantry Brigade delivered a seaborne hook at Pizzo during the night of 7-8 September.

The advance continued along both coastal axes until the line Catanzaro—Nicastro was reached on 10 September, some 100 miles from the assault beaches. The speed of the advance had been determined by the capacity of the engineers to repair the damage caused by demolitions and the speed with which Bailey bridging could be transported forward. The maintenance organization was now feeling the strain of operating over damaged and extended lines of communication while the rate of build-up, particularly of transport columns, was proceeding too slowly to permit the pace of the advance to be maintained. These factors necessitated a short pause.



The Italian Armistice

At 1800 on 8 September, the armistice with Italy was announced, and the following morning reports began to reach the Eighth Army of Operation *Avalanche*. The Fifth Army had begun its landings early the same morning, and was being hard pressed. During the night of 9-10 September, a message was received at

Headquarters, 15th Army Group, from General Alexander, stressing the importance of the Eighth Army bringing all possible pressure on the German forces on its front to assist the progress of the American operations. General Montgomery was also advised of the intention to land elements of the V Corps (British) in the Taranto area to secure the port and the nearby airfields.

Although the Eighth Army administrative facilities were inadequate, it was apparent that risks had to be taken if it was to carry out its task.

The Advance to Potenza

It was impossible, at this stage, to move major forces forward until the reorganization and build-up had progressed, but it was decided that three measures were immediately possible to threaten the south flank of the German forces operating against the Salerno beachhead. First, light forces could advance north of the Catanzaro neck; second, the establishment of the Desert Air Force on the airfields in the Crotone area could be expedited to allow air operations to be developed against the Germans at Salerno and on the Eighth Army front; and, third, the port of Crotone could be opened as quickly as possible to eliminate the long road haul from Reggio.

By the evening of 11 September, Crotone had been taken with its port facilities undamaged and light forces had reached the line Castrovillari—Belvedere. While these advance elements pushed northward, the British 1st Airborne Division (V Corps) was landed, by sea, near Taranto and, on 13 September, General Montgomery took command of this new beachhead.

On 14 September, the XIII Corps was ordered to move one brigade of the 5th Division via the coast road to Sapri, where light forces were then to be pushed toward the Salerno beachhead as far as administrative limitations would permit.

German resistance proved to be weak on the 5th Division front, but extensive demolitions continued to cause great difficulties. Two days later (16 September), the German forces were swinging back their southern flank from the Salerno front, and 5th Division patrols made contact with elements of the Fifth Army near Vallo. By this time, General Clark had the situation well in hand. The immediate crisis had passed, and the beachhead began to grow steadily in strength.

On the same day, reconnaissance elements of the 1st Canadian Division met patrols from the Taranto beachhead. These patrols were operating up to 40 miles from Taranto to make contact with the 1st German Parachute Division, which formed the German garrison in southeast Italy, and which was disposed over some 100 miles between Foggia and Taranto.

Thus, in the face of only light opposition, the advance elements pushed northward, although they were now operating at considerable distances from the main forces. By 19 September, the leading troops of the 5th Division reached Auletta following up the rear guards of the 26th Panzer Division. On the same day, the advance forces of the 1st Canadian Division drove elements of the 1st German Parachute Division out of Potenza.

Meanwhile in the Taranto sector, Tactical Headquarters, V Corps had landed, and the first units of the 78th Division were en route to Bari from Sicily.

Comments on the Operation

From a strategic point of view, the essential question appears to be: Was a sledge hammer used to crack a nut? In the first place, one of the cornerstones of the very high morale of the Eighth Army was the fact that the officers and men knew they would not be committed to offensive operations unless they had every chance of success, and that adequate resources were available to carry out an allotted task. In view of the Eighth

Army role and the enemy situation as known before the assault, it would appear that the forces used in Operation *Baytown* were not excessive.

The question then arises as to whether or not the plan adopted was the best one. There were probably two main alternatives for the employment of the Eighth Army:

1. To reinforce *Avalanche* after Naples had been taken.

2. To land in the Bari—Brindisi—Taranto area.

Whatever alternative seemed reasonable, it was vital that at least some forces were landed on the "toe" to open the Straits of Messina.

To reinforce *Avalanche* would have raised the age-old problem of the attack on a narrow front. Had *Avalanche* failed, the 15th Army Group would have been thrown back on Sicily. In fact, the situation in this sector had been critical throughout the first 7 days of the operation. Second, this first alternative would have entailed an unjustifiable administrative risk, owing to the time which would have been required to increase the capacity of the ports to the degree required for the maintenance of two armies. The necessary resources in ships and craft were not available to permit maintenance over the beaches.

The second alternative was much more attractive, but the problem again arose: Were the shipping and craft available sufficient for the purpose? It has been said that a much smaller force could have achieved the required results by landing in this Adriatic sector, and there can be no doubt that little opposition was met by the leading formation of the V Corps (1st Airborne Division) when it did land near Taranto. However, due weight must be given to the arguments that the situation may have been very different had the XIII Corps not landed on the "toe." Further, inadequate information was available as to the strength and probable resistance of the Axis forces in the area.

This whole problem then seems to resolve itself into the availability of shipping and landing craft, taking into consideration the length of the sea voyage to the assault area and the subsequent build-up problem.

To examine these aspects of the operations one stage further, it must be stressed that the Fifth Army had the situation at the Salerno beachhead under control before the leading elements of the Eighth Army appeared on the scene. Without a doubt, there was some justification for contemporary feeling in the Eighth Army that "we have done it again," but it is difficult to assess the part the British threat from the south did actually play in the withdrawal of the German forces hemming in the American beachhead at Salerno. It is feasible that the XIII Corps advance provided the "last straw" which forced the German Command to decide in favor of abandoning their efforts to drive General Clark's forces back into the sea. To quote General de Guingand (Chief of Staff, Eighth Army): "It gave them a good excuse." In any case it was apparent that, in spite of the strenuous efforts made, the pressure exerted by the British forces at this stage was not very great.

The Principles of War as Applied by England, the United States, and Russia

Digested by the MILITARY REVIEW from an article by Major S. J. Watson in "The Army Quarterly" (Great Britain) April 1950.

An army springs from national life and is not imposed upon it; it, therefore, has the habits and takes the fashions prevalent among the civil population.—General Sir Francis Tuker.

Maintenance of the Aim and Co-operation

THE authoritarian government of Russia has three advantages over the democracies of Britain and the United States:

1. The decision to go to war and the subsequent direction of the war are decided without reference to the people, debates in Parliament, or discussions in the Senate.

2. There is virtual integration of political and military policy.

3. Russia's aim is not likely to be affected by the requirements of her allies. The satellite states are expected to obey orders from Moscow.

In Britain and the United States, it must be expected that:

1. Considerable weight will be given to public opinion. During the last War it proved desirable in England, and essential in the United States, for higher commanders to "get a good press." As Captain B. H. Liddell Hart wrote in *The British Way of Warfare*, "Only an absolute ruler, firmly in the saddle, can hope to maintain unswervingly the military ideal of the 'armed forces objective.' The strategist who is the servant of a democratic government has less rein. Dependent on the support and confidence of his employers, he has to work within a narrower margin of time and cost."

2. There will often be divergencies between military and civil aims.

3. Due consideration must be given to Allies, despite difficulties in co-operating with them. This was well illustrated by Eisenhower's dealings with Giraud and De Gaulle.

Maintenance of Morale

The following quotations give the attitude of the world's most eminent commanders on the subject of morale and welfare.

BRITISH.—Montgomery understood the "civilian army" as few before him. The rigid old discipline was not enforced. Human weaknesses were fully appreciated and the man's lot made as easy for him as possible. This is why he was so lenient as regards dress, and why a certain amount of "personal commandeering"—technically I suppose it might be called "looting"—was winked at. (From *Operation Victory* by Major General de Guingand.)

AMERICAN.—Attention to the individual is the key to success, particularly because American manpower is not only our most precious commodity—it will, in any global war, always be in short supply. (From *Crusade in Europe*, by General Eisenhower.)

RUSSIAN.—Marshal Zhukov showed little interest in measures that I thought . . . should be taken to protect the foot soldier. The Russians viewed measures to protect the individual against fatigue and wounds as possibly too costly. Great victories, they seemed to think, inevitably require huge casualties. (From *Crusade in Europe*, by General Eisenhower.)

In British and American units, considerable care is devoted to the welfare of the individual; from this is developed an intelligent and corporate team spirit. Morale may be impaired by:

1. Attacks against the homeland.
2. Heavy battle casualties.
3. Interruption of the lines of communication, with a consequent shortage of supplies.

The Russians depend for the upkeep of morale upon over-all success, regardless of individual privation or suffering. Only obvious and irrevocable failure is likely to impair it.

Offensive Action

Characteristic offensive action by Russian armed forces is:

1. Local or general attacks backed by the full weight of supporting arms to breach and eventually encircle enemy dispositions.

2. Local counterattacks by infantry against a successful thrust by the enemy, to make him commit his reserves.

3. Large-scale counterattacks by armor against the enemy's spearhead, as soon as his lines of communication are stretched and his reserves committed.

4. Incessant attacks by guerrillas or airborne troops against the enemy's lines of communication to force him to commit fighting formations to garrison and escort duties.

5. Practically a "last-man, last-round" policy, if surrounded.

Presumably, Britain and the United States will start future wars on the strategic defensive, relying on their flexibility, initially, to conduct tactical offensives wherever local superiority can be achieved. It will be vital, at all times, to prevent or defeat the enemy's reconnaissance, and so deny him the information required for planning his own offensives. Once British and United States armies have established a firm base from which to operate, they will certainly take and maintain the over-all offensive with the same determination as the Russians, though not with the same ruthlessness.

Security

The seas, which have hitherto given Britain and the United States security from invasion, entail long and often insecure lines of communication. Furthermore, Britain's concentrations of industry and population are most vulnerable to air attack. There is, consequently, a tendency to overinsure against administrative interruptions, which makes base installations ponderous and static. Potential menaces to security are:

1. Attacks, especially by submarines, against sea lines of communication.

2. Air attacks against base areas and the homeland.

3. Propaganda aimed to split Allied nations.

Protection of bases and communications will absorb the greater part of the initial war effort of Britain and the United States.

Russia is more secure, being self-sufficient; but is, nevertheless, open to:

1. Air attacks against base areas and inland communications.

2. Propaganda to encourage separatist movements in satellite countries.

Concentration and Economy of Force

The Russians are aware of the advantages of concentrating a local superiority in armor and manpower against the enemy. Such concentrations may well achieve some penetration. Defensive techniques must, therefore, aim at:

1. Siting self-contained localities in depth, prepared to fight on if surrounded temporarily.

2. Keeping a strong force for deliberate counterattack.

3. Achieving proficiency in the handling of small arms, so as to kill the enemy as economically as possible.

If Britain and America are eventually to counter concentrations of manpower by concentrations of material, they must practice true economy of force by suppressing their national tendencies to:

1. Squander resources in unprofitable side shows, as, for example, in the Aegean in 1944.

2. Kill an enemy by calling down the impersonal fire of artillery rather than by personally shooting him with a rifle.

Surprise

Russia is likely to achieve surprise by:

1. The intensity and direction of attack.

2. Expoitation of the characteristics of the Russian soldier in:

a. Night attacks and infiltration, both by tanks and infantry.

b. Use of large-scale deception and camouflage.

c. Attacks launched over apparently unsuitable ground and under rigorous climatic conditions.

d. Continuing to fight on in the face of appalling casualties.

Britain and America can, particularly with the aid of sea power, achieve surprise in the direction of their attacks and the concentration of their equipment. They also can make use of their higher standards of education to produce sound deception plans and to forestall surprise by the enemy by training all soldiers to be "intelligence minded." Perhaps, too, Russian recklessness, itself, may be surprised by dogged determination, as happened in Finland in 1939 and, more recently, as the result of the Berlin Airlift.

Flexibility

Inflexibility is the main Russian failing in battle. It is due to:

1. A rigid battle plan, leaving no initiative to subordinates.

2. Lack of efficient radio communications.

3. The consequent need for higher commanders to control the battle well forward, which may lead them to be swayed unduly by events in their immediate vicinity.

4. Fear of the consequences of failure, leading to persistence in forlorn attacks and to encirclement in defense.

On Russian lines of communication, however, the single organization controlling the rear services avoids duplication and affords a greater flexibility in the use of equipment and supplies.

In contrast, the British and Americans achieve considerable flexibility in battle, due to their more developed staff work and better radio communications. But their rear services are far less flexible because of the multiplicity of their equipment. In quest of mobility, they have allocated thousands of road-bound vehicles to their divisions, together with the complementary repair and supply organizations to keep them running. To achieve tactical mobility on roadless steeps in winter weather, it may be quicker to march.

Administration

The dependence of British and American armies on their bases and lines of communication is due to their:

1. High degree of mechanization, requiring guaranteed supplies of fuel.

2. Generous ration scales, including luxury items such as cigarettes.

3. Emphasis on saving life at the overall expense of manpower (by putting, for example, three extra men in the administrative area to maintain a machine which replaces one man in the fighting line).

4. Administration and documentation of each man as an individual.

The Russians are less dependent on their supply system because they:

1. Are less mechanized.

2. Exploit the frugality of their soldiers, accustomed to low standards of living, by making them live off the land.

3. Fight on their own continent (though their shortage of motor transport makes them correspondingly dependent on more vulnerable railways and waterways).

4. Rely on the capture of enemy dumps and equipment, which their soldiers are trained to use.

5. Have no system of personal documentation for soldiers below the rank of major.

Like all modern armies, Russia is becoming increasingly dependent on her

lines of communication. Though Russian soldiers can fight for days without food, their vehicles become useless without fuel. Unlike horses, vehicles cannot themselves be eaten as food. The Russians may thus become sensitive to attacks against their administrative areas and also may find considerable difficulty in advancing over territory where a "scorched earth" policy has been applied systematically.

Simulated Operations

Translated and digested by the MILITARY REVIEW from an article in "Bellona" (Polish language quarterly of military history published in England) April—June 1950.

THE idea of simulated action teams originated with the Polish 1st Independent Parachute Brigade in 1942. These units were never put into actual operation on the front, but lists of equipment and tactical instructions were worked out for their employment. This idea is of particular interest for it was an introduction into the war of the future, the war of automatons working at the touch of a push button.

It was believed that diversionary parachute operations in the enemy's rear, particularly at night, by small, well-equipped teams (three to five men) would tend to mislead and draw the enemy forces in the wrong direction, thus greatly facilitating a planned main operation. The originators of the simulated action units decided, therefore, to enlist the aid of science and the advanced techniques of modern warfare in order to replace men with equipment in such operations.

In 1943, the research on this problem was transferred from the Parachute Brigade to the Engineers' Training Center, where a special section was established with its own laboratory and matériel. Tests and experiments conducted by this organization demonstrated the wide possibilities for using simulated operations in combat. However, the end of the War interrupted these experiments.

Simulated operations were aimed at creating the illusion of combat through the means of technical equipment. Experiments were based on simulating actual combat noise and action to deceive the enemy.

Combat Illusion

First, the sense of hearing was considered. The explosions of artillery shells, the rattling of machine-gun fire in short and long bursts, and the whistling of shells in flight were best suited for affecting the senses of the enemy, especially at night. Simultaneously with auditory impressions, the sense of sight was affected. Smoke, lights moving over the terrain, fires, and troops in action all constituted powerful arguments in persuading an enemy that a battle was in progress in a given area. Also, the odor of smoke and gas affects the sense of smell and helps to add realism to the combat illusion.

As a result of analyzing the senses and experiences of a combat soldier, there was realized a definite need for simulating equipment which would paint a picture of actual battle. However, it was necessary to take one other important factor into account; the infliction of losses on the enemy. For this reason, automatic weapons, controlled from a distance, as well as mortars and mines, were included in the plan of simulated combat.

Simulating Equipment

The equipment used in simulated operations had to be simple to operate, transportable, easy to install, and relatively safe for operating personnel. In addition, simulating equipment had to be installed in terrain which was easily accessible and would provide cover for the equipment and personnel.

The simulated action team had to possess all the equipment necessary for any assigned mission. This included automatic weapons; sound equipment to simulate machine-gun, mortar, and artillery fire; explosives and fuses; rockets; various types of lighting devices; and firing panels for operating the equipment.

The equipment, which was designed to simulate a battle involving units of platoon strength, weighed approximately 200 pounds.

The simulated battle team was composed of five men: one officer or noncommissioned officer as commander, one technical noncommissioned officer responsible for the technical side of the installations, and three privates. The detachment had to be trained in the electro-technical and pyrotechnical fields. In experimental operations, a five-man team was able to install equipment to simulate the fire power of one infantry platoon in 15 minutes.

The ultimate goal of our training in the Army is success in battle. There are no get-rich-quick or push-button methods by which wars can be won in the foreseeable future without fighting ground battles. It always has been, and it still is, the infantryman with his stout and courageous heart who is the dominant factor on the field of battle. He must be effectively supported, of course, by the other arms and services of the Army and by the Navy and the Air Force. But the man who decides the final issue is the infantryman who slugs it out face to face with the enemy and who takes and holds ground.

General Mark W. Clark

7-2419

Balanced Forces and Western Defense

Digested by the MILITARY REVIEW from an article by Air Marshal Sir Robert Saundby in the "Royal Air Force Quarterly" (Great Britain) October 1950.

WHAT is meant by the term "Balanced Forces"? To some people, the term may be a new one, and its meaning not self-evident.

In the past, in this Country, it has come to mean a carefully worked out allocation of the limited part of our national resources earmarked for defense. The object of this allocation was twofold. First, it was to balance the various elements of our available forces to give them the best hope of dealing successfully with any foreseeable trouble within our sphere of responsibility. Second, in the event of a major attack on this Country, it aimed at providing forces capable of bringing us successfully through an opening defensive phase, and at providing time for our war potential and that of the Commonwealth and Empire to develop.

If, in the past, we have had many difficulties, expensive and even disastrous colonial wars, and if, in the two World Wars, we survived the opening phases only by the skin of our teeth, it was not so much because of a lack of proper balance in our forces, but because the total allocation of resources to defense was too small.

In our democracy, which since the days of Queen Elizabeth has not had an aggressive military policy, we have been concerned, mainly, with the advancement of our commerce, the acquisition of national wealth, and the improvement of our standard of living. Any money spent on defense necessarily has meant a diversion of resources from our main objects, and was, therefore, resented by all political parties and by almost all shades of opinion. For this reason, we never had, and probably never will have, military forces in time of peace which are commensurate with our responsibilities. In addition, there has been a tendency lately to widen these responsibilities by undertaking (formerly in the name of the League of Nations, and now the United Nations) to play our part in resisting aggression anywhere in the world.

If we, in the United Kingdom, were to provide the military forces required for the discharge of these responsibilities, or even for the defense needs of our own Commonwealth and Empire, we should, like Russia, have to gear our whole economy in peacetime to the military machine, and lower, accordingly, our standard of living. This is the meaning of Göring's phrase "Guns instead of butter."

This Country and the free countries of the Western world decisively reject the concept. Our Communists and "fellow-travelers" urge us to reject it, on the grounds that if both sides arm war is inevitable. This is, of course, nonsense. The real reason for resisting it is that life, on these terms, is hardly worth living; that it is felt to be absurd, and even monstrous, to prostitute the greater part of our scientific knowledge and our energies to the production of weapons of war, or worse, weapons of mass destruction.

And so we naturally look for some compromise, some scheme which will give us a bare minimum of security, and allow us to devote as much of our resources as we dare to the Welfare State.

Burden of Defense

For a long time now, we have expected the various parts of the Commonwealth

and Empire to share with us, in some degree, the burden of defense. In so doing, we have not urged that each part shall produce a balanced Navy, Army, and Air Force. We have taken note of local conditions, geography, population, and industrial resources. Thus, India provided mainly infantry divisions, the United Kingdom provided the main fleets, armored land forces, and strategic air forces, while the self-governing Dominions added their quotas to the respective forces. Colonial territories, besides providing forces for local defense, raised money for warships, air squadrons, and other matériel.

It was the business of the Combined Chiefs of Staff in London, working in close co-operation with their counterparts in the Dominions, to ensure as far as was practicable that the total resources available, when added together, made up a reasonably balanced defense force. Of course, there might be thin places here and there, and in one or two directions we might seem to be relatively overinsured. As time went on, however, these inequalities were ironed out, and the scheme became better balanced. Its main defect always has been that the total forces available fell a good deal below the minimum required for real security.

For an entire century, from the Battle of Waterloo to World War I, we had no obvious enemy and our fleets were the unchallenged masters of the seas of the world. By the well-timed movement of warships, we were able to influence national policy almost everywhere, and there existed a sort of *Pax Britannica* not unlike the *Pax Romona* of the early centuries of the Christian Era. As a consequence, we devoted to the Navy most of the money earmarked for defense, and the Army, as the campaigns in Crimea, Egypt, and South Africa showed, was dangerously starved of resources and neglected. The disasters of the Boer War in South Africa, however, shook the Country and a reform of the Army was put in hand. By 1914, this had been completed, and when the War broke out we had a small but highly efficient Regular Army, and a substantial, keen, and well-trained Territorial Force. Both Regulars and Territorials suffered from an undue concentration on the rifle and bayonet, with a consequent neglect of automatic small-bore weapons. In spite of that, however, we had a sound, efficient, and balanced defense force that, with the help of our Allies, halted the enemy's armies, and maintained command of the sea.

In 1918, the Royal Air Force came into being; and thus, by the addition of a third service, complicated the question of balanced forces. Arguments raged all through the years of peace, and the Air Force, as a new service, had a hard task to keep its head above water. But by 1935, the great importance of air power, both for home defense and for strategic and tactical air operations, was recognized. When war came again in 1939, our forces were reasonably well balanced; but, once again, far too small for the task they had to face.

Unbalanced Forces

It is true that, during the years of peace, some mistakes had been made. Singapore fell, largely, because a proper balance had not been achieved when allocating resources to its defense. A large sum had been spent on erecting batteries of 15-inch naval guns, instead of providing strong local air forces. This matter had been the subject of an acute controversy between the services, and eventually had been settled by a special committee, which declared in favor of heavy guns rather than air forces. This example shows the disastrous affects of a lack of proper balance in a defense force. Without a doubt, a similar misappreciation, on a

larger scale, could have equally disastrous affects in a vital theater. What would have happened to us, in 1940, had we heeded those who advocated the suppression of Fighter Command on the ground that "the bomber will always get through"?

Thus, the importance of balanced defense forces, made up of components provided by India and a number of self-governing and coequal members of the British Commonwealth, long has been realized. But, since the end of the last War, there has been a new and very significant development. The situation has changed, and the free nations are now faced by the world-wide challenge of aggressive communism. Russia and her satellite puppet states have not disarmed since 1945. They have rearmed, and by every means in their power, short of open violence, they are probing our weak points, undermining and damaging our economy, misrepresenting our intentions and our way of life, and fomenting rebellion and strife everywhere. It is clear that they hate everything about the free world, and intend, if they can, to subjugate it to the rule of the Kremlin and the police state. Negotiation is useless, for you cannot negotiate with a man whose only desire is to murder you. Nothing stands between us and destruction but the strength of our armed forces and our determination to defend ourselves.

It is not surprising, therefore, that the free nations of the world, under the United Nations, are banding themselves together for defense.

Unified Action Required

There is no longer any possibility of achieving a balance of power in Europe. Russia is far too powerful, too rich in manpower and resources, and her economy too deeply enmeshed in an immense war machine. Therefore, we must think in terms of a world balance of power. We have the Atlantic Treaty, an assembly of free nations pledged to support each other and to find armed forces for their common defense. This will circumvent the Hitler technique (of swallowing countries one by one, while speaking fair to the rest—"my last territorial claim in Europe"), and should provide a force that will deter the aggressor or, if aggression should come, ensure eventual victory.

It was against this background that the Chief of the Air Staff said: "If all the Atlantic Treaty Powers stand pat on their traditional military sovereignty and try each to build up what are euphemistically called 'balanced forces' of their own—a lot of little national replicas of what should be the over-all military establishments of the Atlantic Treaty—we shall never get anywhere. Only by accepting the principle of integration and making, each of us, the contribution to which we are best suited, can we possibly afford to build up in the service of the Treaty the truly balanced force which, with the backing of atomic air power, as General Bradley said, will not only be an effective deterrent, but can give us security if ever we are attacked."

We have here a new principle in international affairs. Nations are no longer to possess balanced national forces, but are to find national components of a joint defense force. It will be the business of the Military Commission of the Atlantic Treaty Powers to ensure that all these components add up to a sufficient and balanced force.

What, in practice, will this new principle mean to us, in the United Kingdom and the British Commonwealth? The answer to this question cannot be known until the matter has been settled but we can try to make an estimate.

Naval Forces

It is very clear that there are, today, only two navies in the world that count—our own and that of the United States. The Russians may have many submarines, but they are in no position to exercise command of the seas—they can dispute it only by means of underwater attack. The problem facing the free nations at sea is, therefore, one of safeguarding our sea communications against submarine attack. Since 1914, we have had nearly 10 years' experience of this form of warfare, and we should now know something about it. We know that we require escort carriers, fast escort vessels, specialized submarine chasers, up-to-date radar, and aircraft. Battleships are not required, and even fleet carriers are, I think, of secondary importance. No doubt, there are enough of the latter already in existence in the United States and British navies.

I suggest that the Atlantic Treaty nations should be urged to build antisubmarine vessels and aircraft. For example, if it is true that the French have recently recommissioned the old battleship *Jean Bart*, they should be tactfully persuaded to replace it carefully on the shelf and concentrate, instead, on antisubmarine craft.

Air Forces

In the air, the problem is less simple. In repelling an invasion of Western Europe, the Atlantic Powers will require a properly organized defense, by fighters and antiaircraft guns, of vital areas; powerful tactical forces to support the Allied armies; and a strategic bomber force capable of crippling the enemy's communications, oil supplies, and war industries, and of destroying his airfields. I suggest that each country should be responsible for the air defense of its own vital centers, and for providing an adequate tactical force for service with its army component. In addition, it is clear that the United States will be able to make a great contribution to the strategic bombing force. It has, indeed, been argued that we might well leave this aspect of air power entirely to the Americans, but we must not forget that, in addition to our share of Western defense, we have great responsibilities as the most powerful member of the British Commonwealth. To discharge those responsibilities, we require a balanced air force of our own, and this was recognized by the United States when they recently allocated to us a number of American-built long-range heavy bombers.

It seems clear that the remainder of the Atlantic Treaty Powers should be urged to contribute local defense fighters and tactical air forces.

Land Forces

On land, the great bulk of the armies needed to halt an invasion from the East must be provided by the Western European Powers, though there will be in Germany some British and American forces of occupation. The provision of a sufficient force for this purpose is by far the most difficult problem facing those responsible for Western defense. Although it is not necessary, and indeed not possible, to match the Communist hordes tank for tank or division for division, the disparity in strength, on any method of reckoning, is likely, at the outset, to be too great for safety. In these circumstances, it is clear that the Western European Powers must make the largest possible contribution in land forces. It may well be that Britain and the United States may have to lighten the burden on these countries by undertaking the provision of larger contingents of naval and air forces. It also brings into the limelight the question of making Western Germany responsible for contributing a share of the force

required, and once more raises doubts about the wisdom of our attitude to Spain. These are political questions which can be settled only at the highest level. It is, however, clear that, as far as Germany is concerned, it would be much easier and safer to invite her to provide a national contingent as part of the defense forces of the Atlantic Treaty Powers, than to give her *carte blanche* to rearm herself. It appears to me that a decision on this matter now cannot be long delayed without serious prejudice to the security of the free nations.

It is, of course, an indispensable condition of the successful working of this scheme of integrating the national defense forces of the Atlantic Treaty Powers, that these national components should, as far as possible, use standardized equipment and be trained on common lines. In addition, they must be exercised frequently in co-operation with one another, and a unified command and staff, at least in skeleton form, set up.

All this will require, in some directions, profound changes in the time-honored notions of national sovereignty and prestige. If it is to succeed, there must be genuine good will, and a readiness to sacrifice national prides and prejudices.

There is good reason to hope that, in the face of our common peril, we can rise to the occasion and place the common safety and the common good beyond any national consideration.

Concerted Action

In addition to this powerful moral urge, there is a practical factor which may do much to bring about the desired result. In the present economic plight of this Country, and still more of Western Europe, a great part of the money and equipment for the rearmament of the Atlantic Treaty Powers must come from the United States. This will provide an opportunity for molding national contingents into the desired form, so that they will fit neatly into the pattern. For example, France and Italy, and those countries on which the Treaty Powers will rely for land forces, could be given tanks, guns, anti-tank weapons, and aircraft suitable for a tactical role, while this Country, as mentioned above, has already received long-range bombers in recognition of its need for a strategic bomber force.

Now it is obvious that this conception of national contingents, fitting into their allotted places in a great Allied force, must depend on complete confidence and trust in each other among the member nations. Such confidence will, no doubt, be fostered by the realization that if we do not hang together, we shall all hang separately. But, however it comes about, the growth of such confidence and trust between a considerable number of nations, linked together to preserve their freedom in the face of the cruelest and most aggressive tyranny that the world has seen for centuries, must have a profound and lasting influence for good in world affairs. One of the depressing features of history is the almost universal bad faith, suspicion, and mistrust of nation for nation, and the consequent insistence on national sovereignty and self-sufficiency. If we can integrate our armed forces in face of a threat to our freedom, can we not go further and start to integrate our economies in the interest of all? Indeed, the Schuman Plan is a first beginning of such a development, and, although it may have its defects, it is a move in the right direction.

If we can replace fear and mistrust by confidence and good will among a large and important section of the nations of the world, the gain will be incalculable. As yet, it is a plant of tender growth, and all sensible men and women must do

everything in their power to nurture it. For it is not too much to say that upon it are centered the hopes of the future of western civilization.

Out of evil, therefore, may come good. Out of the envy, hatred, malice, and all uncharitableness that rages behind the Iron Curtain, there may be born in the West the ineffable blessing of international co-operation and trust. Let us hope that it may be so, and that we may live to see, not a third world war in which all that we stand for will be submerged in a welter of horror and destruction, but peace on earth among men of good will.

Delaying Action in Open Terrain

Translated and digested by the MILITARY REVIEW from an article by Lieutenant Colonel J. Maule and Captain M. Bruzelius in "Ny Militar Tidskrift" (Sweden) No. 10, 1950.

IN DELAYING action, terrain obstacles must be exploited in order to compensate for the numerical inferiority of the troops and weapons. Therefore, it is natural for our regulations to prescribe tactical methods for fighting in covered or wooded terrain, for combat in woods is traditional in Swedish defense plans.

However, our troops might be assigned difficult and extensive combat missions involving delaying action in open terrain, and such missions are given only summary treatment in the Swedish regulations.

This article will cover delaying action in open terrain, based on the lessons learned at a recent maneuver in Sweden. During the play of the maneuver, we were told that the enemy had air superiority and was a modern, well-equipped force.

The components of delaying action have been listed as:

1. Fire—delivered from combat positions, or in connnection with counterattacks based on limited objectives.

2. Demolitions and delaying field works —road and bridge demolitions, road blocks, and mine fields.

3. Movement—the reinforcement of positions, disengagements, and withdrawals.

By comparing the use of these components in delaying actions, in covered and open terrain, the differences become apparent.

In open terrain, the fire component is increased. It can be laid down over longer distances, it is easier to direct, and it can be kept more mobile, both in depth and width. The latter point applies, particularly, to the fire from the artillery and mortar formations.

The use of demolitions and delaying field works to slow down the advance of the enemy requires more men and matériel than are normally available and, therefore, must be limited.

During daylight, and in the case of unprotected forces, mobility is decreased and at times impossible.

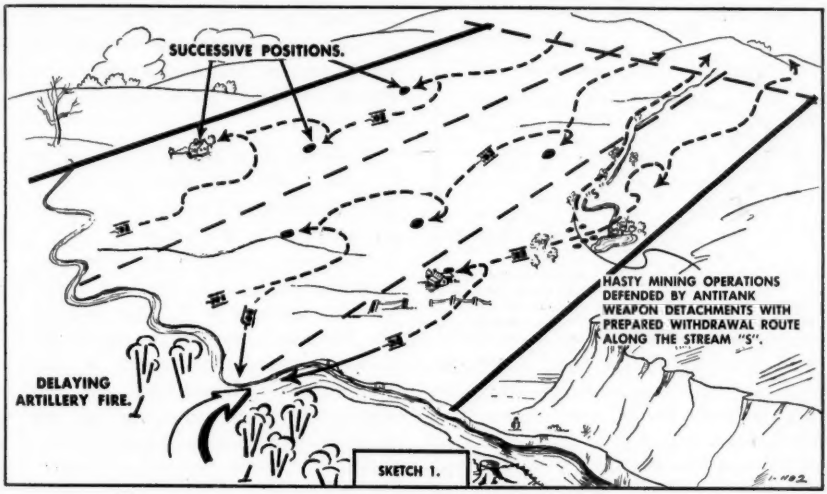
From the differences mentioned above, it should be apparent that in the case of delaying action in open terrain:

1. Fire is a decisive factor, and its mobility must counterbalance the lack of mobility on the part of the combat forces.

2. Demolitions and delaying field works must be used, mainly, where good results may be counted on, with only limited commitments of personnel (for example, the blowing of a bridge to delay or hinder the advance of tanks and armored formations). Moreover, the use of demolitions and delaying field works should attempt

to draw or force the enemy into prepared approach routes, rather than attempting to stop him or force him into the open.

3. During the daytime, mobility can be assured only through the use of tanks and self-propelled artillery (with the exception of small troop units). In all other cases, troop movements must be made under the cover of darkness. Delaying forces, once engaged, should continue defensive action until darkness will permit their safe withdrawal.


SUCCESSIVE POSITIONS.
HASTY MINING OPERATIONS DEFENDED BY ANTITANK WEAPON DETACHMENTS WITH PREPARED WITHDRAWAL ROUTE ALONG THE STREAM "S".
DELAYING ARTILLERY FIRE.
SKETCH 1.

Time is a vital factor in delaying action. Enemy forces seldom allow enough time to make elaborate defense plans, or to change organization structures to favor delaying action. The delaying forces, although of limited strength, must be trained sufficiently to detain the enemy. However, there must be reserve formations available to be used where needed. This reserve should include tanks and armored formations in order to increase the mobility of the delaying forces during daylight and as protection against enemy fire.

Artillery is used to cover the areas between the armored formations, and to protect the flanks. Smoke concentrations, fired by mortars and artillery, provide an efficient means for assisting the tank formations in making withdrawals. Self-propelled artillery, if available, provides greater mobility and assistance in withdrawing and regrouping the tank forces. The use of self-propelled artillery also helps other artillery units in withdrawing and stabilizing the defense in depth.

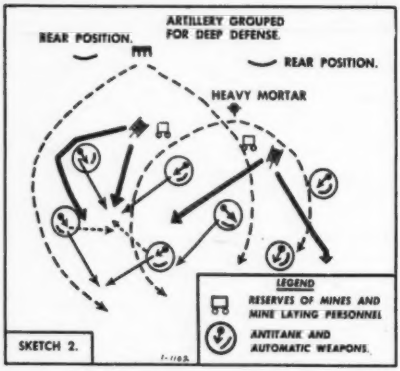
The commander of each zone of action must have control of all forces in that zone. In addition, his command post must be located far enough to the rear to enable him to observe the action within the zone and issue the orders necessary to influence the conduct of the battle.

During the course of the battle, the tanks deliver repeated concentrations of surprise fire, and then move to other positions in the immediate area, or toward the rear.

Strategically located mine fields and troops lying in ambush can assist in the withdrawal of personnel to other defensive positions. However, such delaying

tactics must be supported with mobile antitank weapons.

A delaying action, organized in this manner, is shown in Sketch 1.

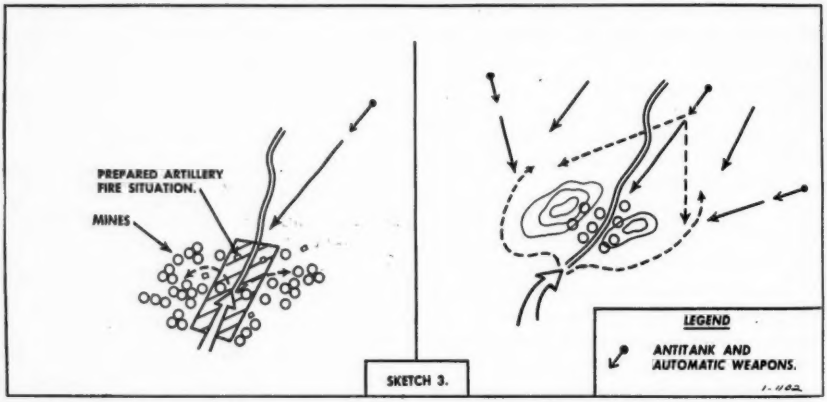


In covered or wooded terrain, delaying action can be organized, progressively, from the front to the rear. However, in open terrain, delaying action must be organized in depth at almost the same time, for the threat of a sudden penetration is always great.

The entire area over which the delaying action is to be carried out must be divided, in depth, into suitable zones. In the first zone, the enemy is delayed by the tank formations mentioned above. The remaining zones are defended, mainly, by infantry and antitank forces, supported by artillery and mortar fire.

When fighting delaying action in covered terrain, positions, normally, are established only in the areas through which the enemy is expected to advance. Areas which restrict the movements of enemy forces are kept under surveillance, but not occupied.

However, when fighting delaying action in open terrain, all areas must be occupied, laterally and in depth. Such an organization can be achieved, even with limited troop strength, by organizing at least one strong point in each zone, and by using machine guns, antitank weapons, and other measures to assist in the defense. These strong points should be grouped checker-board fashion in order to achieve maximum connecting fire, and to assist the withdrawals of particular strong points. A mobile reserve of tanks and self-propelled antitank weapons should be available to reinforce the strong points, or to go over to a limited counterattack, if required. In addition, such a reserve must be able to place fire on any area not covered by the connecting fire of the strong points. A plan for a delaying action



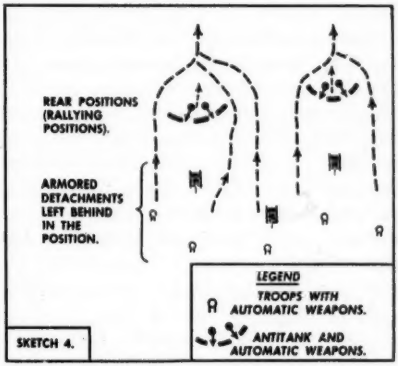
position organized in this manner is shown in Sketch 2.

Due to the limited strength of the delaying forces, and the necessity for using small groups to occupy the strong points, there is always the tendency for personnel to evacuate their positions too soon because of the mental urge to withdraw to the rear. This is a problem which only adequate training and efficient leadership can overcome.

As was stated earlier in this article, demolitions and delaying field works are limited by the personnel and matériel available. The laying of mine fields is considered the best solution when fighting a delaying action in open terrain. If mines are laid, they must be co-ordinated with the fire of the delaying forces so that the fire forces the enemy into the mine fields, or the mine fields force the enemy into the fire. (See Sketch 3.)

The evacuation of delaying positions is also of great importance. Generally, this should be done under cover of darkness. However, in order to avoid giving the enemy the impression that the positions are always evacuated as soon as darkness falls, the time for leaving the positions should be varied as much as possible. Another way to mislead the enemy is to make an advance at dusk or after dark, prior to a withdrawal, to give the enemy the impression that the positions are going to be defended the following day.

The forces left behind in a night withdrawal should include antitank personnel as well as infantry. It is almost impossible to evacuate the antitank weapons during daylight, and without them the infantry would be overrun quickly, or would yield their positions in the face



of heavy resistance. However, these forces can be supported, later, by self-propelled antitank weapons and artillery in order to complete their withdrawal. A plan for evacuating the delaying positions is shown in Sketch 4.

When a withdrawal is forced, or the enemy is pressing the delaying forces too hard, it may be necessary to launch a counterattack. Such counterattacks must be planned and carried out with tank and antitank formations, supported by artillery and mortars. Infantry troops must establish the base from which the armored formations launch the counterattack, and where they will reassemble after completing the operation.

Today, war, total war, is not a succession of mere episodes in a day or week. It is a long drawn out and intricately planned business, and the longer it continues the heavier are the demands on the character of the men engaged in it.

Secretary of Defense George C. Marshall

Health Education in the Assembly of the Hong Kong Force

Digested by the MILITARY REVIEW from an article by Warrant Officer J. Sloan in the "Journal of the Royal Army Medical Corps" (Great Britain) August 1950.

THE assembly of the British Army force in Hong Kong, between June 1949 and February 1950, was accompanied by an interesting advancement in mass health education. For the first time, as far as is known, an effort was made to indoctrinate an entire force, not with scattered and unco-ordinated lectures, but by skilled teams working in concert towards a definite objective.

The dominating theme of the project, both in planning and in execution, was to provide each man with such information as to enable him to maintain his health and to protect himself against preventable disease.

The task of preparing the officers and men for the "risks potential" in their new station devolved upon the Medical Directorate at Far Eastern Land Forces (FARELF) Headquarters in Singapore. There, it was decided to tackle the job in such a way that, as far as possible, the men would receive health instruction before their arrival in Hong Kong.

To achieve this, it was necessary to put teams of experienced lecturers aboard the troopships to carry out their work on the voyage from Singapore to Hong Kong. During certain phases of the operation, however, it was not unusual for several ships to sail virtually on the same schedule and, as the availability of suitable instructors was limited, it was necessary, from time to time, to vary the original intention and provide the instruction immediately after the arrival of units in Hong Kong. In one instance, the lectures were given on the voyage between Ceylon and Singapore and, in another, while the troops were delayed at Singapore due to damage to their ship.

The new force was being built up of regular soldiers and national servicemen. Many of them had never been overseas before, and of those who had, few had been to the Far East. Therefore, to understand the perplexities of the job, it is necessary, first of all, to look at Hong Kong as it was visualized by the average British soldier. To him, this was no posting to the desert or the jungle, but a move to an often acclaimed high spot of the Empire.

He regarded Hong Kong as nothing more or less than a British city overseas, and, if the "old soldier" was to be believed, a first-rate military station. He had no knowledge of the proposed disposition of the force, and the planners realized that it was going to be difficult indeed to convince him that such a place, as he imagined it, could present any threat to his health. There were also among the men those who displayed inherent indifference to the entire move. To them, Hong Kong was just a "far away place." Of its geographic and climatic aspects, they knew very little, of its social development and natural history, they almost certainly knew nothing at all.

Each lecture team, as far as possible, included an officer and two senior noncommissioned officers. The personnel selected had all spent considerable time in the Far East. Fortunately, a team of instructors from the School of Hygiene, FARELF, had been active with the garrison force in Hong Kong, during May and June, and had lectured to the first reinforcement battalion on its arrival in the colony. This team was recalled to

Singapore and embodied into the new scheme. Its up-to-the-moment appreciation of conditions and health hazards in the new operational area formed a good topical foundation on which the other teams could build.

Scope of Instruction

The primary object of the work was clearly given in the original directive as: "To provide instruction in hygiene to officers and men proceeding to Hong Kong." The subjects to be covered were:

1. Excremental diseases—cause and prevention.
2. Field Sanitation.
3. Personal Hygiene—including bites and stings, skin diseases, and venereal disease.
4. Water and Health—including heat exhaustion.
5. Sterilization of water.
6. Scrub Typhus—transmission and prevention.
7. Malaria—including personal protection.

In order to ensure unequivocal instruction on all troopships, the lecturers were collected together at the School of Hygiene and briefed on the data to be imparted. The *modus operandi*, however, was left sufficiently fluid to allow each instructor to handle his particular subjects in his own individual style. This proved to be a wise policy and the lecturers developed quickly the ability to adjust their methods to suit the varied requirements of different audiences.

A comprehensive timetable was drawn up to enable the teams to cover the syllabus in 4 days and, although many factors arose to cause the original schedule to be modified, the teams, often working under difficult conditions, managed to impart all the material to the personnel on each ship.

In the light of experience gained on the earlier ships covered by the scheme, it was subsequently deemed advisable to temper the bare facts of health maintenance with interesting bits of local information. The idea was to fit the new arrival smoothly into his future environment, and to give him the benefit of applicable local knowledge even if, sometimes, it meant going beyond the generally accepted bounds of pure hygiene. This required much forethought and careful planning as it was imperative to ensure that the importance of the subject matter was not diminished by the addition of topical adjectival material. The instructors quickly developed skillful methods of getting the Hong Kong picture over to the men without prejudice to the primary object of the task in hand. An explanation of the careless characteristics of native food and refreshment dealers, the danger of commerical ice in drinks, the threat from disreputable ice cream dealers, the use of human feces as manure by native farmers, and the consequent danger in eating ill-prepared fresh vegetables helped to press home the excremental problem. Similarly, the influence of climatic conditions and the irresponsibility of many local laundry contractors assisted the instructor in his talks on skin diseases.

In the lectures on rabies, it was found beneficial to explain the widespread, but illegal, practice of killing dogs to satisfy the Chinese habit of eating "sweet flesh" (dog meat) and the consequent defensive attitude that had been kindled in the animals, before explaining the stringent antirabies precautions of the colony.

Methods Varied

Different team leaders used different methods, but generally speaking that was how the subjects were tackled. The three examples shown had counterparts in the remainder of the syllabus, and no matter how the material was dressed up, the whole idea was extremely popular with the men.

Beneficial instruction was given in an interesting way, in a way, in fact, which often raised considerable enthusiasm in the men, so facilitating their appreciation and assimilation of the important facts. As each course progressed, audiences began to regard the team personnel as advisors rather than instructors and a relationship, something akin to golfer and caddie, sprang up between them. Questions were always encouraged, and the men usually responded well.

During the massing of the force, teams worked aboard nine troopships. One of the teams lectured to troops from five other ships immediately after their arrival in Hong Kong, and to the complement of one troopship while she was delayed in Singapore. In all, 14,056 officers and men were covered by the scheme.

It is difficult, at this stage, to form any definite conclusions as to the lasting benefit which the force derived from the work. Nevertheless, many interesting points were revealed and a great deal of useful data built up.

Conclusions

1. The circumstances of this military movement provided a unique opportunity for mass health education to a large force.

2. The methods used by the teams were original, but the success achieved justified any license which may have been taken.

3. There is a lamentable lack of general health knowledge among the troops. For example, only about 1 man in 10 knows why he has been vaccinated or inoculated. The question "Why were you vaccinated?" produced such unexpected answers as . . . protection against Syphilis . . . Polio . . . Influenza and Diphtheria!

4. The significant factor in this educational scheme is the way in which the subject is put over to the men. It must never be drab or a casual standby for filling in blank spaces in an otherwise well-planned program. It cannot be handled by a reluctant or disgruntled stop-gap instructor. Only the enthusiastic lecturer, combining knowledge, showmanship, and a genuine understanding of the man-in-the-ranks, can hope to attain anything like maximum success. To strike the right note may require the preparation of a separate lecture for each different group of men, but the reaction which the individual touch promotes is well worth the effort. In this scheme, the interest of the men surprised everyone and it is instructive to investigate the reasons.

a. Everyone aboard ship had to attend, and when the men saw the officers at the lectures they were convinced of the importance of the material.

b. The instructors, boarding the ship in the East, brought with them an air of local authority. The general view seemed to be that, as they were the men on the spot, they must be worthy of attention.

c. The subject matter was skillfully dressed in a fondant of current topics.

d. It was put over in such a way that it sounded like a consideration of the personal problems of each individual.

e. The talks were usually illustrated by demonstrations and exhibits.

f. The talks were always given in language which caused neither embarrassment to the educated nor confusion to those of lesser intellect.

g. Careful and thoughtful planning at every level can do a lot to ensure success. This was vividly revealed when, by chance, an all-Scots team went aboard the *Empire Trooper* to give instruction to an almost completely Scottish complement. The fact was hailed as a triumph of thoughtful organization and the team, in consequence, started off with a big advantage.

h. The attitude of the officers was variable in the extreme. Some senior officers were rather concerned that such instruction, coming just before landing, might tend to make the men overcautious

to the detriment of military performance, a circumstance not substantiated by subsequent events. Other officers, in spite of the lectures, obviously underestimated Hong Kong and quite openly said that they thought the preparations were overelaborate. Fortunately, both groups were in the minority and most officers were agreed that the scheme filled a most dangerous gap in the present troop movement organization. Quite a number, in fact, declared it to be one of the most important developments they had encountered in recent years.

i. The move was spread over several months and it was possible to follow up the instructions by visits to units after they had settled down in Hong Kong.

j. The efforts of the teams, who were, after all, performing a new task, gave rise to much discussion and healthy argument. Many constructive suggestions were offered. The majority of listeners thought the scheme should be extended over a longer period than 4 days. Others asked that it be extended to include talks by "Education" and "Intelligence" on their particular aspects of the new stations. Not everyone was in complete agreement with the syllabus and wanted certain subjects gone into more fully, even to the sacrifice of others.

k. One highly significant factor emerged. While the ideal men to handle a job like this are doctors who are good lecturers, it is definite that a high standard can be reached using trained laymen instructors who know their subjects and have the ability and showmanship to impart them effectively to others.

The Norwegian Army Staff School

Translated and digested by the MILITARY REVIEW from an article by Major Rolf Eriksen in "Militaer Orientering" (Norway) 10 May 1950.

ON 24 April 1950, the first course was started at the Army Staff School. This article will cover some of the background and planning in establishing this school.

Need for Higher Training

The normal training period for professional officers in the Army (with the exception of purely technical or special administrative positions) is 2 years at the Army Military Academy. However, it is obvious from the curriculum of the Army Military Academy that its primary aim is to give only fundamental training for professional Army officers. On this basis, it becomes clear that its graduates are not fully trained officers.

It is assumed that all professional officers will, sooner or later, serve on a higher staff. Therefore, the higher staffs in the Army must be recruited from personnel who are specially schooled and qualified for staff duty. Even for service in the lower staffs, officers graduating from the Army Military Academy need supplementary training.

In other words, there is a need in the Army for additional training in staff duties, in order that young officers may be able to perform staff duties in an efficient manner.

The experiences of the last War proved the necessity for co-operation between the different services, as well as between the military, civilian, and economic defense authorities.

There is need, therefore, for training on a level high enough to enable one to see national defense in its entirety. This is not just an Army problem; it concerns all branches of the military establishment.

Prewar Organization

Before the War, it was customary for most officers graduating from the Army Military Academy to attend the 2-year course at the Army War College. The Army War College was also attended by officers from the Navy, but this was the exception. Generally, naval officers obtained their higher-level training by attending other courses. Consequently, the Army War College was, for all practical purposes, an Army school. We did not possess an institution which presented instruction on a level high enough to enable one to see defense in its entirety.

This was a great weakness, especially in the light of the necessity for co-operation between all of the defense branches.

The United States has its "Armed Forces Staff College" with instruction in the fields of joint operations, joint overseas transportation, and the joint theater of war. In addition, the Americans have the "National War College" and an "Industrial College of the Armed Forces."

England has its "Joint Services Staff College" and its "Imperial Defence College."

The Norwegian Defense Commission, a group appointed to make a survey of Norway's military needs and organizations, has found it necessary to develop a school capable of training a limited number of officers to evaluate and deal with matters which concern the entire military defense system.

A committee, appointed by the Defense Commission, has outlined the principal aims of this school as follows:

1. To prepare selected officers from all services for command and staff duties in the highest level of defense, especially where co-operation between other services is necessary.

2. To familiarize selected officers from the various services with the problems of economic mobilization.

3. To qualify students to carry on independent study and research in subjects connected with the exercise of command, staff duty, and economic warfare.

In addition, the school is to aim at increasing the mutual understanding between the higher units in the various services and co-operation between the defense department and the civil, technical, and scientific institutions of learning.

The Defense Commission has outlined the following points which the school's curriculum should include:

1. Instruction covering the entire military defense establishment, the civil aspects of total defense, social structures, and staff leadership.

2. The military organizations of other countries.

3. The general principles of strategy.

4. A study of Norway's defense problems and defense possibilities from the standpoint of foreign policy, military geography, and strategy, together with the conditions governing combined attack operations against Norway.

5. Instruction covering the concepts and doctrines which form the basis for the defense of Norway.

6. A study of the particular problems and possibilities for fighting defensive battles in Norway.

7. Instruction covering the principles of co-operation with our allies, including our experiences from the last War.

8. The most important trends in military development, especially with regards to new and improved technical means.

The establishment of a new school—the National Defense Academy—is expected to satisfy this need for higher-level training based on a unified national effort.

A director and three head instructors—one for each service—have been appointed and are now occupied with getting the National Defense Academy ready for operation. It is expected to be in operation by the end of 1951.

Staff Courses

The Commission does not see any reason for the continuation of the Army War College in its old form, since, in itself, it does not fulfill present requirements satisfactorily.

However, there must be some institution to provide the necessary training to prepare officers for the higher-level instruction to be offered at the National Defense Academy. Therefore, the Commission has proposed that staff courses be instituted in all of the defense branches.

The Norwegian Army Staff School, above, prepares professional Army officers for the higher level instruction they will receive while attending the National Defense Academy.

The Army Staff School

Suggestions as to how the Army Staff School should be organized were not presented by the Commission. The details were left to the military authorities, thereby leaving the Commander of the Army relatively free in making decisions as to the courses to be presented at the Army Staff School. The Commander of the Army pointed out that the aim of the courses would be to prepare officers for anticipated assignments in staff positions in those echelons of command where the training received could be best utilized.

Length of Instruction

The factors which influenced the Army Commander in determining the duration of the staff course were:

1. The time available for preparation.
2. The material which had to be presented.
3. The desire to present comprehensive instruction.

All this had to be considered in connection with the need for getting the school into operation without any considerable break in the staff's work.

A course at a staff school requires very comprehensive preparation if it is to be successful. Preferably, all lecture notes, map maneuvers, and written exercises must be ready before the course begins, for experience shows that it is difficult to

find time for preparational work during a course. Officers attending a course should feel that the instruction is well prepared and of value to them.

The need for starting staff training was of great importance. Twelve years have gone by since the last group of officers graduated from the Army War College, and during this time, 300 to 400 officers have been graduated from the

An instructor at the Army Staff School illustrates a problem on the sand table.

Army Military Academy. Since the War, we have trained, or have in training in foreign military institutions, some 20 to 25 officers. Further, about 100 positions in the Army, according to the Defense Commission, are assumed to be occupied by personnel with general staff training. Today, we have 30 to 40 with such training.

During the War, the British staff courses were reduced to 3 or 4 months. The students were instructed only in matters which prepared them for staff duties on the brigade level. They studied nothing concerning management and administration. In addition, all thought of individual studies had to be given up. These courses were pursued with an intensity which is difficult to imagine under peacetime conditions. British officers have stated that the quality of the product (staff officers) graduating from these courses was poor, and cannot be compared with the results which are now being obtained in their staff courses of 9 to 11 months' duration.

It must be remembered that our officers must be trained in the administrative services and peacetime administration, staff duty and tactics in the combined regiment, as well as the organization and problems of the Home Guard, the Local Guard, and Civilian Administration.

Among the younger officers, there is a certain amount of opposition toward "emergency solutions" in the matter of training. This is true especially in the case of personnel affected by such a solution, who believe they are not receiving complete training and that this lack of training will be of considerable consequence to them later in life. There can be scarcely any doubt but that there is at least a grain of truth behind such reasoning.

We have had "supplementary courses" and "adaptational courses" without supplementary training since the liberation. For this reason, we have many categories of officers with varying degrees of training, who make up a heterogeneous command group.

Program of Instruction

The central idea in the instructional program is staff service in peacetime and staff service and tactics, on the combined regimental level, in time of war.

On the basis of the aims which have been set for the courses, the following main divisions of instruction have been established:

Period	*Time in weeks*	*Subject*
1	3	Administration and management
2	3	Organization and Staff Service
3	7	Defensive Action in Combat
4	6	Offensive Action in Combat
5	3	Special Warfare
6	2	American and British Staff Services

The Evolution of Defensive Action

Translated and digested by the MILITARY REVIEW from an article by Colonel Giovanni Gatta in "Bolletino d'Informazioni" of the "Scuola di Guerra" (Italy) No. 3, 1950.

THE art of war, particularly tactics, is in a state of continuous evolution.

The principal factor in this evolution is the weapons and forces used. As combat means change, so do the tactical methods employed.

While this evolution is manifested in both offensive and defensive action, this article will confine itself to defensive action and its evolution from a linear form to the present organization in depth.

Linear Defense

Continuous linear defense, which was practiced for nearly 2 centuries, was a result of the popular belief that the armament of the infantry consisted of only one weapon. Even after abolishing the pike in favor of the gun with its bayonet, the infantry armament consisted of a single type weapon, and thus, the linear type defense was maintained.

With the advent of the machine gun, a change was made in the defense by substituting a machine gun for a section of line of the same fire capacity. This rapid-fire weapon, capable of laying down a continuous stream of movable fire, became a strong point. With the increase in the number and kinds of unit weapons, the strong point increased by grouping mortars, antitank guns, and assault forces with automatic weapons to form a solid resistance in place. And so, solid-line defense gave way to a defense in which scattered strong points were established, but the fire power was not increased. The only advantage gained through the use of the new weapons was a reduction in the number of men required to man the defenses.

In order to increase the fire power available in the defense, it was necessary to echelon the defensive elements in depth. This was possible because the very nature of the new defensive concept permitted firing through the intervals between the advance elements. Thus, the defense was transformed from a linear form to a form organized in depth.

Lessons of World War I

The experiences of World War I had shown that the defense should thin the forces occupying the advance posts, and strengthen those directly behind the advance posts. This procedure resulted in the establishment of two defense zones: an observation zone and, behind it, a sector of resistance. The primary missions of the forces in the observation zone were to provide surveillance and, through the use of strong points, to channelize the enemy into predetermined avenues of approach which were better suited for resistance. The primary missions for the forces in the sector of resistance were to break, arrest, or force the enemy to withdraw by counterattacks. The sector of resistance was divided into three smaller zones: the combat zone, the support zone, and the zone of reserves.

By organizing the main defensive positions into several zones, the defending forces were able to channelize the enemy forces into the areas best suited for defensive action, instead of being forced to fight in areas where the terrain was more favorable to the enemy.

Between the Wars

During the period immediately preceding the outbreak of World War II, the concept of organizing defensive strong points and a defense in depth began to

gain headway. The main reasons for this were:

1. The great penetrating possibilities of armored vehicles.

2. The importance of strong points in the battles of Belfort, Verdun, Reims, Arras, and Ypres in World War I.

This concept brought out clearly that defense, whether in the strategic or tactical domain, or as practiced by a large or small unit, must be considered in depth as well as in the width of the frontal position.

Defense During World War II

At the beginning of World War II, offensive action surprised the defense with its mobility and striking power.

The use of motorized transport permitted the offense to bring mass to bear at preselected points and at a predetermined time. After the action had started, this mobility permitted attacking forces to be reinforced easily with reserves to provide an attack in depth. In addition, the striking power and mobility of armored units permitted the offense to break through defensive positions with relative ease and speed.

The inability to halt or retard offensive forces for the time necessary to prepare for the defense resulted in an overwhelming advantage for the offensive forces. The defender but rarely succeeded in maneuvering in such a way as to regain the initiative and inflict decisive blows.

The first lesson that was learned from the War was that defensive positions must be organized for all around defense. Such a defense still permitted frontal continuity by means of supporting fires and close co-operation between adjacent strong points.

The first test of this new concept was in the construction of the *Dyle* defense line between Antwerp and Namur. The individual defensive elements were organized as strong points in such a way as to be able to resist attacks even from the flanks and the rear.

Later, a second lesson was learned by providing more depth in the defense and organizing rear positions for a position defense.

These lessons formed the basis for organizing successive defense positions. The forces in the first position had the task of smashing the hostile formations or channelizing them toward areas most favorable for defense. The units in the second position had the task of slowing or wearing these formations down, or stopping them. The mobile reserves, located in the third position, had the task of counterattacking and annihilating hostile formations.

This defensive concept, even during World War II, did not possess any new characteristics. Even in the past, the defense always had been based on the possession of the most important terrain and key points and the manning of such positions with the best forces available.

Conclusions

The new aspects of war which must concern defense are:

1. The great strategic and tactical mobility of present-day large units, which permits their employment with great rapidity.

2. The great striking and crushing power of armored units, particularly when their action is combined with close-support aircraft.

3. The great vulnerability of defensive positions once they are discovered by air observation.

4. The greater possibilities of attack by air-landed and amphibious forces.

5. The increased range of modern weapons.

6. The increased employment of self-propelled weapons.

In view of these aspects, it is necessary for the defense to be able to react

quickly against a concentration of forces, and be able to halt, repel, or annihilate the attacking forces.

In order to achieve this, the defense must be based on the ability to move forces quickly to danger areas and, with the paucity of forces normally available, limit static defense to key points. In addition, an organization in depth should be maintained only along the easiest routes of penetration or the direction of the enemy's main effort. In this way, defensive forces will be able to employ their reserve forces quickly in central areas.

In the sense of its depth, the defense area comprises:

1. A zone of security, corresponding to the terrain where the advance elements of the defense operate, with the mission of security.

2. A zone of resistance, corresponding to the terrain in which are deployed the organic means and the reinforcing means of the defense, with the mission of defense to the death.

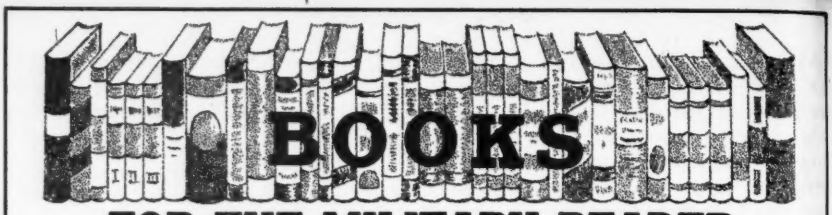
The organization of the defense may assume differing aspects in individual cases depending on specific missions, the nature of the terrain, the relationship between forces and the front to be defended, and the enemy situation.

I should like to point out the fundamental differences between the American and German concepts of the General Staff. Frequently we have been charged with having something extraneous to American thought and American ideas, something that was dangerous and ougth to be guarded against.

The German Army earmarked promising young officers for permanent assignment to an elite general staff corps, where they enjoyed special assignments and preferential treatment as to promotion and privileges.

We have not the least desire to institute such a discriminatory system in our democratic Army. We hold, in fact, the opposite view, for we feel that we develop better officers by rotating them in their assignments between staff and command duties. In that way we seek to broaden their experience in order to help them develop the capacity to make sound decisions and to act on those decisions quickly with skill and determination.

General J. Lawton Collins



FOR THE MILITARY READER

UNITED STATES ARMY IN THE WORLD WAR, 1917-1919. Vol. 7. Office of the Chief of Military History, Department of the Army. 921 Pages. US Government Printing Office, Washington, D.C. $4.75.

The Somme offensive, one of the five major Allied offensives of 1918, got under way, on 8 August, with three Allied armies taking part. So successful was the first day's operation, that the Allies completely overran German positions between Le Quesnel and Morcourt, and captured over 16,000 prisoners. General Erich von Ludendorff, Chief of Staff of the German GHQ, called it "the blackest day of the war." Two weeks later, on 22 August, Field Marshal Douglas Haig, Commander in Chief of the British Expeditionary Forces, stated "the enemy has not the means to deliver counterattacks on an extended scale" and issued instructions that "the most resolute offensive is everywhere desirable."

The 27th and 30th Divisions of the American II Corps entered the Somme offensive on the night of 23-24 September as part of the British Fourth Army which was to deliver the main blow. Operating under the orders of the Australian Corps, the Americans took up positions west of the Hindenburg Line. The respective objectives of the two divisions were strongly fortified towns of Bony and Bellicourt.

On this section of the front, the Germans made use of the St. Quentin Canal as the primary feature of their formidable Hindenburg Line. Between Bellicourt and a point about ½ mile north of Bony, where the canal passed through a tunnel, they took advantage of spacious underground passages, deep enough below ground to be safe from the heaviest bombardment, to install barracks, storehouses, and other accommodations for their troops.

On 29 September, the Americans and Australians broke through the line and, by evening, had control of all the dominating crests. By 5 October, the Allies in the Somme area were east of the Hindenburg Line. News of the cracking of this hard shell of German resistance swept through the Allied world as a harbinger of victory. On 6 October, the American II Corps took over from the Australian Corps and began to operate as a tactical unit, remaining in action until 21 October, by which time the Allies had driven past the Oise-Somme Canal.

Amply illustrated, Volume 7 consists primarily of battle instructions, field orders, operations reports, and intelligence summaries of the American II Corps and the Australian Corps.

F.D.R.: HIS PERSONAL LETTERS, Vol. III, 1928-1945. Edited by Elliott Roosevelt. Foreword by Eleanor Roosevelt. Illustrated. Two Vols. 1,616 Pages. Duell, Sloan & Pearce, New York. $10.00 the set.

OUT OF THIS WORLD. By Lowell Thomas, Jr. 320 Pages. 100 illustrations. The Greystone Press, New York. $3.75.

BLUNDER IN ASIA. By Harrison Forman. 190 Pages. Didier, New York. $3.00.

UNIFORM CODE OF MILITARY JUSTICE. By Colonel Frederick Benays Weiner, Judge Advocate General's Corps, United States Army Reserve. 275 Pages. Combat Forces Press, Washington, D.C. $3.50.

By LT COL JAMES GARNETT, *JAGC*

This text is a well organized comparison between the Uniform Code of Military Justice (which becomes effective 31 May 1951) and the previous Articles of War, with comments showing the intent of Congress in enacting this new code, which subjects all members of the armed forces to one set of disciplinary laws.

It is written in easily understandable language and will be useful to all ranks (Army, Air Force, Navy, Marine Corps, and Coast Guard) in connection with (but not in place of) the new Manual for Courts-Martial which is now in process of preparation. Its usefulness, however, will by no means end with the services' publication of the Manual, for it is a book which will be found in the library of the military and naval lawyer and which will be used frequently by him in the futherance of his duties.

WAR AND CIVILIZATION. By Arnold J. Toynbee. Selected by Albert Vann Fowler. 165 Pages. Oxford University Press, New York. $2.50.

Selected passages from Arnold J. Toynbee's six-volume *A Study of History* provide a provocative study of war and militarism.

THE SPEARHEAD: The World War II History of the Fifth Marine Division. By Howard M. Conner. Illustrated. Designed by Albert Margoliers. 325 Pages. Infantry Journal Press, Washington, D.C. $6.50.

OUR OIL RESOURCES. Edited by Leonard M. Fanning. 420 Pages. McGraw-Hill Book Company, New York. $5.00.

A symposium: a revised second edition.

THE SOLDIER'S LOAD AND THE MOBILITY OF A NATION. By Colonel S. L. A. Marshall. 122 Pages. Combat Forces Press, Washington, D.C. $1.00.

By LT COL DONALD T. KELLETT, *Inf*

In his latest book, the author of *Men Against Fire* presents worth while views on two essentially basic subjects which have been seriously neglected by the majority of military leaders.

The first concerns the pack load of the individual soldier, and the need for a field pack scaled down to a minimum of gear and ammunition. The author contends that the individual soldier is still "as heavily burdened as the soldier of 1000 years B.C."

The second decries the overwhelming wastage implied in the gigantic division slice of World War II, with its corresponding lessening of the mobility of the field army as a whole. The author states, as regards stock-piling, that "Only the matériel *moved and used* contributes to success in war. That which remains stored is a gift to the enemy."

This volume, well worth the attention of all military men, is inexpensively presented in field manual format.

THE LINCOLN ENCYCLOPEDIA. By Archer H. Shaw. 395 Pages. The Macmillan Company, New York. $6.50.

Here is an excellent compilation of Abraham Lincoln's views on philosophy, law, politics, slavery, democracy, and a score of other subjects.

The author has done a brilliant job of preparing a volume of ready reference for students of Lincolniana. He says, "It is a collection of some 5000 quotations from the speeches, letters, and papers, of Abraham Lincoln." Many of Lincoln's popular sayings have been omitted because they lack authenticity.

Cross references are supplied to help locate quotations, and the sources of the quotations are listed so that the reader may pursue the subject further.

ENGINEERS OF THE SOUTHWEST PACIFIC, 1941-1945. Vol. I, Engineers in Theater Operations. Vol. III, Engineer Intelligence. Vol. VII, Engineer Supply. Prepared by the Office of the Chief Engineer, General Headquarters, Army Forces, Pacific, and edited by Lieutenant Colonel George A. Meidling, CE. US Government Printing Office, Washington, D.C. Vol. I, 375 Pages, $6.50. Vol. III, 467 Pages, $7.00. Vol. VII, 366 Pages, $6.50.

By COL GEORGE C. REINHARDT, *CE*

Profusely illustrated with maps, charts, and photographs, this full-length, detailed study presents an encyclopedic format which its context justifies. Chronologically presented, well indexed, each volume is, in fact, an exhaustive text on that feature of the engineer operations treated. While the entire series encompasses eight books, Volume I, subtitled "Prelude to the Over-all Report," is, indeed, a readable summary of the whole.

The preparation of these volumes was directed by higher authority to present factually "engineer plans, operations, and capabilities under the singular conditions of the Southwest Pacific" as well as the "difficulties met and their ultimate solutions."

Planners as well as pedants should find research in this broad specialized coverage well repaid.

SOVIET POLITICS—The Dilemma of Power. A Study of the Role of Ideas in Social Change. By Barrington Moore, Jr. 503 Pages. Harvard University Press, Cambridge, Mass. $6.00.

A revealing analysis of the role and the fate of Marxist ideas in Soviet politics.

ECONOMICS OF TRANSPORTATION. By Marvin L. Fair and Ernest W. Williams. 757 Pages. Harper & Bros., New York. $5.50.

HOW TO SURVIVE AN ATOMIC BOMB. By Richard Gerstell, Ph. D. 150 Pages. Illustrated. Rinehart & Company, Inc., New York (For Combat Forces Press). $1.95.

By MAJ JAMES A. KLEIN, *Inf*

This brief, lively, and easy to absorb handbook informs the reader as to how to protect himself against the effects of an atom bomb.

Written in question and answer form, this guide book indicates the precautionary measures that individuals must take in order to survive an A-bomb attack whether they live in cities, in small towns, or in the country.

The author, who was a radiological safety monitor at Operation *Crossroads* and who now is consultant to the Office of Civil Defense, describes the bomb's effects simply, calmly, and factually. This treatment of this weapon should do much to allay the fears of people whose knowledge of the A-bomb is limited, or is based upon hearsay and misinformation.

WAR AND THE MINDS OF MEN. By Frederick S. Dunn. 115 Pages. Harper & Brothers, New York. $2.00.

By IVAN J. BIRRER, *Ph. D.*

The thesis underlying UNESCO—that wars begin in the minds of men and it is there that the defenses of peace must be constructed—is subjected to an objective, realistic, and scientific analysis. The author demonstrates that the "minds-of-men" theory is a problem in the field of communication. He then answers the crucial questions ". . . what can be communicated—by whom, to whom, and in what manner—in order to achieve the desired goal of making war less likely?" His findings, while aimed at UNESCO, can be generally applied to all efforts at changing men's minds. The reader will applaud the author's candor as, in the concluding chapter, he sets forth his suggestions for UNESCO now—the *now* being after the start of Korea.